

December 2007

# CHEMICAL DEMILITARIZATION

## Additional Management Actions Needed to Meet Key Performance Goals of DOD's Chemical Demilitarization Program



G A O

Accountability \* Integrity \* Reliability

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>DEC 2007</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2007 to 00-00-2007</b>	
4. TITLE AND SUBTITLE <b>Chemical Demilitarization. Additional Management Actions Needed to Meet Key Performance Goals of Dod's Chemical Demilitarization Program</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Government Accountability Office, 441 G Street NW, Washington, DC, 20548</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>93</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



Highlights of [GAO-08-134](#), report to congressional requesters

## Why GAO Did This Study

Destruction of the nation's remaining stockpile of chemical weapons in a safe, efficient, and timely manner is essential to meet Chemical Weapons Convention treaty obligations and to reduce the risk of a potential catastrophic event. The Department of Defense (DOD) established the Chemical Demilitarization Program to manage the destruction of the remaining stockpile. GAO was asked to evaluate the (1) progress DOD and the Army have made in addressing GAO's prior recommendations to strengthen program management, (2) reasonableness of schedule milestones, (3) reliability of cost estimates, and (4) effectiveness of efforts to provide monetary incentives to the systems contractors. GAO reviewed relevant planning documents, schedules, cost estimates, and contracts; interviewed program and contractor officials; and visited chemical agent destruction sites.

## What GAO Recommends

GAO recommends that DOD and the Army develop interim destruction goals, approaches, and milestones; establish time frames to complete its risk management approach; develop realistic schedule and closure cost estimates; finalize and independently review cost estimates; and determine whether a greater emphasis can be placed on schedule and cost, and develop more objective award fee performance evaluation criteria. DOD concurred or partially concurred with 12 of GAO's 13 recommendations.

To view the full product, including the scope and methodology, click on [GAO-08-134](#). For more information, contact Davi D'Agostino at (202) 512-5431 or [dagostinod@gao.gov](mailto:dagostinod@gao.gov).

# CHEMICAL DEMILITARIZATION

## Additional Management Actions Needed to Meet Key Performance Goals of DOD's Chemical Demilitarization Program

### What GAO Found

DOD and the Army have taken steps in addressing GAO's prior recommendations to strengthen program management by establishing an overall strategy and supporting implementation plan, but some key elements, such as annual performance measures for some key goals, including interim destruction goals, are not fully developed. Moreover, actions DOD and the Army have taken to identify and mitigate the risk of future program schedule extensions and cost growth have not been effective because the Chemical Materials Agency's risk management process has not been fully developed or integrated with DOD's risk management process. As a result, managers lack an integrated and systematic approach to evaluate and manage risk.

Recently achieved destruction rates may indicate that adjusted schedule milestones are overly conservative. Moreover, the program's schedule was extended in 2005 in response to the slower-than-anticipated destruction rates experienced since 2003, when more optimistic milestones were adopted. GAO's review of processing rates achieved at the sites since the revised schedule determined that most sites are significantly ahead of the revised, extended program estimates for recently completed munitions campaigns. For example, Umatilla, Oregon, completed destruction of one of its rocket munitions by August 2007, about 12 months earlier than forecasted.

GAO was not able to verify the accuracy of the program's cost estimates because of shortcomings in the underlying cost data, such as undefined facility closure requirements and unstable baseline costs. GAO determined that the usefulness of the earned value management tool to provide visibility over the program's cost performance is limited because of these shortcomings. The program's projected cost growth is largely attributable to longer schedules and increased costs associated with facility closure estimates. GAO estimated that a 1-month schedule extension would cost an additional \$9.5 million. Also, schedules used for the closure cost estimates for destruction sites have increased, from 12 months to about 30 months at some sites, but they have not been finalized or independently reviewed.

Since 2003, the Army has actively managed criteria for determining monetary fees—largely award fees—it provided systems contractors to incentivize their performance. These fees had emphasized safety and environmental compliance, and Army officials acknowledged that award fees did not successfully control schedule and cost growth. In 2006, after audit results and DOD direction, and while extending the schedule, the Army reinstated schedule as a performance measure. The award fee plan allows site project managers flexibility to weigh performance measures within a range, and GAO determined that the high end of the range for management was generally selected, rather than for schedule and cost. Most criteria in the program's award fee plans are subjective and are not linked to objective outcomes as much as possible, as called for in DOD guidance. Given the program's maturity, GAO found that the Army could apply more weight to performance measures, such as schedule and cost, and add objective criteria in these plans.

---

# Contents

---

<b>Letter</b>		<b>1</b>
	Results in Brief	7
	Background	12
	DOD and the Army Have Taken Steps to Strengthen Program Management, but Have Not Fully Developed an Integrated Approach for Measuring Performance and Managing Risk	22
	Recently Improved Destruction Rates for Chemical Munitions May Indicate Overly Conservative Schedule Milestones at the Four Incineration Sites	31
	Shortcomings in Underlying Cost Data Make Earned Value Management Results Unreliable and Limited Our Ability to Determine Cost Estimate Reliability	38
	The Army Has Actively Managed Award Fees and Could Further Emphasize Schedule and Cost and Link Award Fees to More Objective Performance Measures	47
	Conclusions	62
	Recommendations for Executive Action	64
	Agency Comments and Our Evaluation	66
<b>Appendix I</b>	<b>Scope and Methodology</b>	<b>70</b>
<b>Appendix II</b>	<b>Two Recently Introduced Performance-Based Incentive Fees</b>	<b>74</b>
<b>Appendix III</b>	<b>Comments from the Department of Defense</b>	<b>78</b>
<b>Appendix IV</b>	<b>GAO Contact and Staff Acknowledgments</b>	<b>84</b>
<b>Related GAO Products</b>		<b>85</b>
<b>Tables</b>		
	Table 1: Status of DOD’s Chemical Agent Stockpile Sites and Chemical Agent Destroyed as of September 30, 2007	19

---

Table 2: Comparison of Some Key Destruction Objectives Identified in DOD's Strategic Plan and CMA's Strategic Plan	24
Table 3: Comparison of Performance Measures Identified in the PART, OSD Strategic Plan, CMA Strategic Plan, and Selected Acquisition Report	30
Table 4: Comparison of Estimated Operation Completion Dates	34
Table 5: Number of Days Saved per Site since 2005 Program Office Schedule Estimates	35
Table 6: Potential Operational Cost Savings Associated with Days Saved since 2005 Schedule Estimate	36
Table 7: Number of Months of Improvement in 2007 Program Current Estimate for Operations Completion versus 2005 Army Program Office Estimate and 2005 DOD Independent Estimate	37
Table 8: CMA Assessed Confidence in Achieving DOD Schedule Milestone and April 29, 2012, Treaty Deadline	38
Table 9: Changes in Estimated Total Program Cost	39
Table 10: Comparison of GAO's Independent Estimates to Complete Operations and Closure Activities with the Systems Contractor's and Program Manager's Estimates	46
Table 11: Percentage of Award Fees Earned at the Incineration Sites and Newport, from Fiscal Year 2003 to Fiscal Year 2006	52
Table 12: Performance Measures and Weights in Award Fee Plans, Fiscal Years 2003-2007	55

---

## Figures

Figure 1: U.S. Stockpile of Chemical Agents and Munitions	13
Figure 2: Umatilla Chemical Agent Disposal Facility, Umatilla Chemical Depot, Oregon	14
Figure 3: Delivery of a Ton Container to the Processing Building at the Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana	16
Figure 4: Intermodal Storage Containers at the Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana	18
Figure 5: 2005 Program Office Schedule Estimates by Processing Rates, Downtime, and Risk	33
Figure 6: Comparison of the Performance Baseline with the Planned Budget and Systems Contractors' Estimate at Completion	43

---

Figure 7: Comparison of the Monetary Incentive Fees Earned by  
Systems Contractors at the Incineration Sites and at  
Newport during Fiscal Year 2006

50

---

**Abbreviations**

ACWA	Assembled Chemical Weapons Alternatives
APB	Acquisition Program Baseline
CAIG	Cost Analysis Improvement Group
CMA	Chemical Materials Agency
CWC	Chemical Weapons Convention
DOD	Department of Defense
DPPBI	Director's Programmatic Performance Based Incentive
EAC	estimate at completion
EVM	earned value management
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
PART	Program Assessment Rating Tool
SAR	Selected Acquisition Report

This is a work of the U.S. government and is not subject to copyright protection in the United States. It may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.



United States Government Accountability Office  
Washington, DC 20548

December 6, 2007

The Honorable Adam Smith  
Chairman  
The Honorable Mac Thornberry  
Ranking Member  
Subcommittee on Terrorism and  
Unconventional Threats and Capabilities  
Committee on Armed Services  
House of Representatives

The Honorable Jim Saxton  
House of Representatives

Destruction of the nation's remaining stockpile of lethal chemical weapons in a safe, efficient, and timely manner is essential to meeting U.S. treaty obligations under the Chemical Weapons Convention (CWC)<sup>1</sup> and to reducing the risk to the public and the environment of a potential catastrophic event. In 1985, Congress directed the Department of Defense (DOD) to destroy the U.S. stockpile of lethal chemical agents and munitions in the United States with the requirement that DOD was to ensure maximum protection for the environment, the general public, and the personnel involved in the destruction efforts. DOD designated the Department of the Army as its executive agent, and the Army established the Chemical Demilitarization Program to destroy the stockpile at nine storage sites.<sup>2</sup> The United States and more than 180 other countries are signatories to the CWC, which went into effect in 1997. The CWC prohibits

---

<sup>1</sup>The Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction is commonly known as the Chemical Weapons Convention.

<sup>2</sup>In 1996, Congress directed DOD to evaluate the use of alternative technologies and suspended incineration planning activities at two of the nine storage sites with assembled weapons—Blue Grass Chemical Agent-Destruction Pilot Plant, Blue Grass Chemical Activity, Kentucky, and Pueblo Chemical Agent-Destruction Pilot Plant, Pueblo Chemical Depot, Colorado. See Pub. L. No. 104-201, § 142 (1996) and Pub. L. No. 104-208, § 8065 (1996). In addition, Congress directed that those two sites be managed in a program independent from the Army's Chemical Demilitarization Program and report directly to DOD instead of to the Army. See Pub. L. No. 105-261, § 142 (1998). The two sites are managed under a separate program known as the Assembled Chemical Weapons Alternatives program, and are not the focus of this report.

---

the use of chemical weapons and mandates a deadline of April 29, 2012, for the United States to destroy the existing stockpiles.<sup>3</sup>

DOD's Chemical Demilitarization Program has not experienced a chemical event since its inception in 1985 that resulted in an environmental catastrophe or death, but the program has experienced some potentially serious events and has been plagued by numerous schedule revisions, cost growth, and long-standing management weaknesses. The Chemical Demilitarization Program is managed as a major defense acquisition program and, as such, has cost and schedule milestones that are contained in an Acquisition Program Baseline (APB). As of September 30, 2006, Congress had appropriated about \$15.8 billion for the program. In 2005, DOD reported that the program had exceeded its milestones under the 2003 APB in excess of Nunn-McCurdy thresholds for cost and schedule

---

<sup>3</sup>The U.S. deadline for 100 percent destruction of the unitary stockpile was extended from April 29, 2007, to April 29, 2012. The CWC allows an extension of up to 5 years, and an extension was granted to the United States at its request in December 2006. For purposes of this report, we refer to the extended CWC deadline of April 29, 2012, as the U.S. treaty deadline, unless otherwise indicated.



---

performance<sup>4</sup> for the second time in 3 years,<sup>5</sup> and new schedule milestones and cost estimates were being developed. These revisions increased DOD's estimated costs for the entire Chemical Demilitarization Program by 33 percent from about \$24 billion in 2003 to about \$32 billion in 2005. Moreover, the Army's revised cost estimates for the portion of the program responsible for destroying the stockpile, the Chemical Stockpile Elimination Project,<sup>6</sup> increased by more than 53 percent from about \$15.8 billion in 2003 to about \$24.2 billion in 2005. A large percentage of this increase was attributable to revised government cost estimates for the destruction facility contracts. In April 2006, DOD announced that the program will not meet the extended CWC deadline of April 29, 2012, for total destruction of its stockpile, and it estimated that only 66 percent of the stockpile will be destroyed by then. DOD also announced that it would seek resources to complete destruction as close to the CWC deadline as possible and separately requested authority to provide additional

---

<sup>4</sup>A Nunn-McCurdy unit cost breach occurs when a major defense acquisition program experiences an increase of at least 15 percent in program acquisition unit cost or procurement unit cost above the unit costs in the current APB. Unit cost reporting is required by 10 U.S.C. § 2433. For programs with unit cost increases of at least 25 percent, a certification by the Secretary of Defense is required. Certification responsibility has been delegated to the Under Secretary of Defense for Acquisition, Technology, and Logistics, who, by law, must certify that (1) such an acquisition program is essential to national security; (2) there are no alternatives to such an acquisition program, which will provide equal or greater military capability at less cost; (3) the new estimates of the program acquisition unit cost or procurement unit cost are reasonable; and (4) the management structure for the acquisition program is adequate to manage and control program acquisition unit cost or procurement unit cost. See 10 U.S.C. § 2433 (b)(2)(A) (2007).

<sup>5</sup>Total program cost estimates exceeded APBs in 2001 and again in 2005. On May 2, 2002, the Under Secretary of Defense for Acquisition, Technology, and Logistics—the Defense Acquisition Executive—submitted a Nunn-McCurdy breach certification to Congress for the Chemical Demilitarization Program as required by 10 U.S.C. § 2433. The unit cost breach was due primarily to (1) revised processing rates; (2) schedule extensions; (3) new environmental regulations; (4) worse-than-expected condition of the stockpile; (5) increase in equipment, labor rates, and construction costs; and (6) higher emergency preparedness costs. On May 6, 2005, the Under Secretary of Defense for Acquisition, Technology, and Logistics again certified to Congress that the program acquisition unit costs for the Chemical Demilitarization Program had increased 41 percent (in then-year dollars) due primarily to more realistic schedule estimates associated with operations and closure phases, environmental regulatory compliance, and concept/design maturation. Program acquisition unit costs for the Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana, program increased by 52 percent (in then-year dollars) due primarily to more realistic schedule estimates associated with the nerve agent neutralization process and secondary hazardous waste generation.

<sup>6</sup>The Chemical Stockpile Elimination Project includes the program's four operating incineration sites and two bulk-agent-only neutralization sites.

---

monetary incentives if systems contractors operating the incineration sites could accelerate their destruction activities to safely exceed, meet, or finish destruction near the CWC deadline. Moreover, the program's remaining four incineration sites—Anniston Chemical Agent Disposal Facility, Anniston Chemical Activity (Anniston), Alabama; Pine Bluff Chemical Agent Disposal Facility, Pine Bluff Chemical Activity (Pine Bluff), Arkansas; Tooele Chemical Agent Disposal Facility, Deseret Chemical Depot (Tooele), Utah; and Umatilla Chemical Agent Disposal Facility, Umatilla Chemical Depot (Umatilla), Oregon—were forecasted to miss the CWC deadline for the first time.<sup>7</sup>

In the past, the program has had long-term problems in meeting all of the schedule milestones for destroying the stockpile, in part because of the lengthy environmental permitting processes prior to operation start-up and unexpected conditions of the aging munitions. The stockpile destruction program managed by the Chemical Materials Agency (CMA) has now reached a more mature phase, and CMA and its systems contractors have more experience in incinerating each type of chemical agent and munition in its stockpile as well as neutralizing bulk nerve and blister agents.

DOD, the Army, CMA, and the systems contractors that operate the destruction facilities face a difficult and hazardous task, as well as the need to overcome some significant technical challenges, in destroying the U.S. stockpile of lethal chemical agents while ensuring the safety of workers, the public, and the environment. Recognizing these difficulties and the unique program risks, DOD uses a contract that reimburses the systems contractors for all reasonable, allowable, and allocable costs. To encourage defense contractors to perform in an innovative, efficient, and effective way in areas deemed important to the program's success, DOD gives its systems contractors the opportunity to earn millions of dollars through monetary incentives known as award and incentive fees.

We reported in 2003 that DOD and the Army had not developed an overall strategy and risk management approach for the chemical demilitarization program to guide the program with a set of principles and a means to

---

<sup>7</sup>These four incineration sites; the neutralization site at Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana; and the two closed sites that were at Johnston Atoll in the Pacific Ocean and Aberdeen Chemical Agent Disposal Facility, Maryland, are managed for the Army by the Chemical Materials Agency, which was formerly known as the Program Manager for Chemical Demilitarization.

---

manage risk, understand its evolution and implementation, and determine whether initiatives are achieving their desired results.<sup>8</sup> The absence of an overall strategy and risk management approach left the program without a clear road map to monitor program performance and meet the goal of destroying the chemical stockpile in a safe and timely manner. We recommended that DOD and the Army adopt practices that leading organizations embrace for effectively implementing and managing programs, to include promulgating a comprehensive mission statement, long-term and annual performance goals, measurable performance indicators, and evaluation and corrective action plans. DOD concurred with our recommendations and stated that it would establish these management tools. A list of related GAO products regarding chemical demilitarization and storage and disposal of the chemical weapons stockpile is included at the end of this report.

We also reported that overall DOD programs have paid contractors large amounts of award fees on acquisitions that are falling behind schedule, overrunning costs, and experiencing significant technical problems.<sup>9</sup> In addition, we recommended, among other things, that DOD instruct the military services to move toward more outcome-based award fee criteria that are both achievable and promote accountability for acquisition outcomes.<sup>10</sup> DOD concurred with the recommendation and, in a March 2006 policy memorandum, addressed desired outcomes and the role the award fee should play in the overall acquisition strategy. The memorandum stated that “while award fee contracts are used when it is neither feasible nor effective to devise predetermined objective performance targets, it is imperative that award fees be tied to identifiable interim outcomes, discrete events or milestones, as much as possible.”

This report responds to a request from the House Committee on Armed Services’ Subcommittee on Terrorism and Unconventional Threats and Capabilities that we conduct a review of DOD’s Chemical Demilitarization Program. Specifically, this report evaluates the (1) progress DOD and the

---

<sup>8</sup>GAO, *Chemical Weapons: Sustained Leadership, Along with Key Strategic Management Tools, Is Needed to Guide DOD’s Destruction Program*, [GAO-03-1031](#) (Washington, D.C.: Sept. 5, 2003).

<sup>9</sup>GAO, *Defense Acquisitions: DOD Wastes Billions of Dollars through Poorly Structured Incentives*, [GAO-06-409T](#) (Washington, D.C.: Apr. 5, 2006).

<sup>10</sup>GAO, *Defense Acquisitions: DOD Has Paid Billions in Award and Incentive Fees Regardless of Acquisition Outcomes*, [GAO-06-66](#) (Washington, D.C.: Dec. 19, 2005).

---

Army have made in addressing our prior recommendations to strengthen program management, whether this progress has been sufficient to correct past program weaknesses, and the effectiveness of actions DOD and the Army have taken to identify and mitigate the risk of future program schedule extensions and cost growth; (2) reasonableness of the methodology used to determine schedule milestones; (3) reliability of its cost estimates; and (4) effectiveness of DOD's and the Army's use of monetary incentives to improve systems contractors' performance.

To assess the progress DOD and the Army have made in implementing GAO's prior recommendations to strengthen program management, whether it has been sufficient, and the effectiveness of actions taken to identify and mitigate the risk of future program schedule extensions and cost growth, we obtained and reviewed strategic and implementation plans and interviewed cognizant officials to identify whether key elements were present, such as a program mission statement, long-term goals and objectives, delineation of roles and responsibilities of DOD and Army offices, and near-term performance measures. To assess the reasonableness of the methodology used to determine schedule milestones as well as the reliability of cost estimates, we reviewed current program estimates, destruction schedules, earned value management (EVM)<sup>11</sup> data, and other documents. We also obtained and reviewed the program's risk management plans and related documents. In addition, we identified the issues that had caused delays and ascertained approaches being used to reduce the potential for delays in the future. To analyze the effectiveness of DOD's and the Army's use of monetary incentives to improve systems contractors' performance, we obtained and reviewed contract documents on the award fees offered to the systems contractors, and interviewed DOD and Army officials as well as systems contractors' representatives. We obtained and reviewed the incentive agreement plan and incentive fees for the Aberdeen Chemical Agent Disposal Facility (Aberdeen), Maryland, and Newport Chemical Agent Disposal Facility, Newport Chemical Depot (Newport), Indiana, to determine the challenges those sites faced in negotiating the incentive fee agreements. Also, we interviewed officials

---

<sup>11</sup>The Office of Management and Budget (OMB) defines EVM as a project management tool that effectively integrates the project scope of work with cost, schedule, and technical performance elements for optimal project planning and control. Beginning in August 2005, OMB specifically required federal agencies and contractors to use EVM systems on all new capital assets. See Office of Management and Budget, *Capital Programming Guide* (Washington, D.C.: 2006). Also, DOD requires the use of EVM on all programs greater than \$20 million.

---

with the U.S. Army Sustainment Command, CMA, and CMA and systems contractors at Tooele and Umatilla. In addition, we met with DOD and Army program officials and interviewed officials at two of the chemical agent destruction sites.

This report focuses primarily on the seven CMA-managed chemical destruction sites—Aberdeen, Anniston, Johnston Atoll in the Pacific Ocean, Newport, Pine Bluff, Tooele, and Umatilla. We selected these sites for our review because most are in the operational phase, represent about 82 percent of the remaining stockpile of chemical agents to be destroyed, and have reached a level of maturity in processing a variety of types of munitions and agents that will help meet CWC goals. Two sites—Aberdeen and Johnston Atoll—have already completed operations and have either been closed or are being closed. This report does not focus on the two chemical agent destruction sites that are part of the Assembled Chemical Weapons Alternatives (ACWA) program—Blue Grass Chemical Agent-Destruction Pilot Plant, Blue Grass Chemical Activity (Blue Grass), Kentucky, and Pueblo Chemical Agent-Destruction Pilot Plant, Pueblo Chemical Depot (Pueblo), Colorado—because they are currently in the design and construction phase to destroy chemical agents, report directly to DOD rather than to the Army, and because these facilities are not forecasted to begin destruction operations before the CWC deadline, although the stockpiles at these two sites are required to be destroyed by the deadline as well.

We examined the reliability of the data used in this report by verifying EVM system certification, applying analytical tests to the EVM data, and examining EVM system effectiveness in providing meaningful performance measurement to program management. We determined that the EVM system as used at each site was not reliable, which is discussed more fully in the report. We conducted this performance audit from May 2006 through July 2007 in accordance with generally accepted government auditing standards. A more thorough description of our scope and methodology is provided in appendix I.

---

## Results in Brief

While DOD and the Army have taken steps toward addressing our prior recommendations to strengthen program management by establishing strategic and supporting implementation plans, they have not fully developed an integrated approach for measuring performance or for

---

managing risk.<sup>12</sup> DOD issued a strategic plan in June 2005, and CMA issued a strategic plan in July 2005 and a risk management plan in May 2006. While these plans identify challenges and contain performance measures to monitor progress, we found that the plans lack schedule goals for key phases. Neither DOD's 2006 baseline nor its April 2006 and April 2007 *Selected Acquisition Reports* (SAR) to Congress include schedule milestones extending beyond 2012. The program further lacks annual performance goals linked to long-term strategic goals, such as meeting the extended April 29, 2012, CWC deadline. Without this linkage, program officials will lack the information on interim progress needed to determine whether corrective action is needed to safely destroy the stockpile by the treaty deadline. Furthermore, while CMA's integrated risk management plan identified a process for conducting risk management, the agency has not developed the tools needed to implement its approach, such as a risk trade-off analysis. For example, the program's plans identified contamination of the mustard agent stockpile at one site as a key risk but lacked a method for analyzing that risk or managing its potential effects on cost and schedule. The later discovery of the extent of the contamination delayed planned operations by more than 12 months. Also, our analysis showed that DOD's and the Army's processes for identifying risk are not integrated across sites or organizations, and CMA's identified risks have not been fully aligned with those identified in DOD's strategic plan. Consequently, program managers are hampered in their information sharing and their progress in safely destroying chemical agents, as well as in their ability to systematically evaluate and manage risk. Finally, unlike more useful annual performance plans we have reviewed, which include historical performance trends and multiyear future goals, CMA's annual performance plan has a single-year focus. We are recommending that the Secretary of the Army incorporate historical trends and multiyear future goals in its annual performance plan; develop interim destruction goals, approaches, and milestones; and establish a time frame for implementing its risk management approach, including integration across sites and with DOD.

Recently achieved processing rates have considerably exceeded forecasted rates at the operational sites and indicate that DOD's revised schedule milestones may be too conservative to be a realistic measure. DOD extended its Chemical Demilitarization Program schedule in 2005 in response to the slower actual destruction rates experienced than had been

---

<sup>12</sup>GAO's prior recommendations are found in [GAO-03-1031](#), p. 26.

---

estimated when more optimistic milestones were adopted in 2003. As we have previously reported,<sup>13</sup> best practices for schedule development call for assumptions that are both up-to-date and reasonable. Using a new schedule methodology, and as a result of factoring in slower processing rates and greater risk, CMA extended schedules at each site between 62 months and 80 months beyond the baselines established in 2003. The extensions prompted budget and acquisition reviews, including an independent cost and schedule assessment, which in turn led DOD to further extend the program's schedule milestones for completing destruction operations and closure activities. Our analysis of recently achieved processing rates showed that at the time of our review, the sites were between 2 months and 39 months ahead of the revised estimates for munitions destruction. Revised schedule estimates published in the April 2007 SAR further reflect processing rates that considerably exceed forecasts. Nevertheless, DOD has no current plans to reassess the program schedule milestones, as such reassessments are usually prompted by schedule slippages. Higher destruction rates than scheduled indicate that an independent reassessment of the program's scheduled milestones may be warranted, thus assuring DOD and Congress of the reasonableness of the baseline against which its progress is being measured and of its costs as the current schedule is not providing DOD and Congress with a reasonable baseline against which to measure progress and cost. We are recommending that the Secretary of Defense direct the Cost Analysis Improvement Group to assess the reasonableness of schedule milestones, and that DOD periodically review the program's processing rates to determine whether the milestones are still reasonable and include schedule milestones for completing destruction operations and facility closure activities in the program's baseline and acquisition report.

Shortcomings in the underlying data used in the program's EVM showed that the cost estimate is unreliable. Our review showed that performance baselines lacked validity and had not been stable because all requirements, such as closure costs, are not fully identified and included in program cost estimates and because large amounts of additional costs are added to the performance baseline annually. In addition, systems contractors' cost estimates were significantly lower than the Army's cost estimates, due largely to the Army's expectations of longer operational periods and greater closure requirements. The program's cost increases are largely

---

<sup>13</sup>GAO, *Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs*, [GAO-07-1134SP](#) (Washington, D.C.: July 2007, Exposure Draft).

---

attributable to extended schedules and facility closure estimates. Best practices indicate that cost estimates should be comprehensive, and DOD guidance further reflects the need for valid and stable performance baselines from which to make projections and perform trend analysis. DOD and Congress currently lack accurate estimates for budgeting for and funding all activities through facility closure. Similarly, given the significant differences between the contractors' and Army's cost estimates, an independent cost review would provide DOD and Congress assurance that cost estimates are realistic. We are recommending that the Army define closure requirements and develop accurate and realistic closure cost estimates; define all contract requirements, including authorized unpriced work associated with facility closure activities, and establish a time frame for placing these requirements on contract; and that an independent review of the cost estimates be done and linked with reasonable schedule milestones.

According to the Army and based on our analysis, award fees—the predominant fees—offered to contractors have thus far not satisfactorily resulted in the control of schedule performance outcomes and cost growth. Army officials indicate that the majority of the award fee incentives are dedicated to achieving high standards for safety, surety, and environmental compliance in recognition of the lethal nature of the chemical agent stockpile and the congressional mandate for maximum protection of the workforce, the public, and the environment. The Army has actively reviewed and adjusted criteria for determining award fees it has provided to the systems contractors to incentivize aspects of their performance. Based on our analysis, from 2003 through 2006, the award fee plans have heavily emphasized safety and environmental compliance and did not have a separate performance measure for schedule until 2006. Army officials acknowledged that award fees have not satisfactorily resulted in the control of schedule and cost growth. In response to our previous recommendations, in March 2006, DOD issued policy guidance directing that award fees be tied to identifiable interim outcomes, discrete events, or milestones as much as possible. CMA issued its award fee policy in September 2006, and our review of this policy indicated that CMA did not clearly or fully incorporate the concept of tying “award fees to identifiable interim outcomes, discrete events or milestones as much as possible,” as directed in the March 2006 DOD guidance. In addition, the current award fee plan for the five chemical demilitarization sites we reviewed allows government site project managers flexibility in weighting each performance measure within a set range. We found that managers have selected the high end of the range for management, and the low end of the range for schedule and cost, when determining award fee



---

percentages. Moreover, many performance measures in the award fee plans contain subjective award fee criteria, and award fees for the most part are not linked to objective or measurable criteria. Our analysis showed that it is possible for CMA to further link award fee criteria in this program to objective or measurable outcomes in at least three performance measures. Given the maturity of the operations phase at the incineration sites and Newport, although not legally required, we identified opportunities, from a management perspective, to apply more weight to performance measures, such as schedule and cost, to better align CMA's award fee policy with DOD's policy, and to make greater use of objective, measurable criteria in award fee plans to increase the likelihood of meeting the April 29, 2012, treaty deadline. Two recently established and planned performance-based incentive fees for the incineration sites are focused on schedule. One fee was established in 2005 to encourage and reward collaboration among the incineration site systems contractors with the goal of improving the overall program schedule and cost performance. This fee is awarded based on sites' collective performance and, in fiscal year 2007, this incentive fee focused mostly on schedule performance associated with achieving the CWC treaty deadline. The other planned incentive fee, as authorized by Congress, is structured to accelerate destruction operations and facility closure at the incineration sites. We could not determine how effective these incentives might be due to the collective manner in which the fee to encourage and reward collaboration is earned, its relative size, and recent focus on objective schedule performance, and because the other planned incentive fee has not yet been implemented. We are recommending that the Army (1) determine whether greater weight can be applied to key performance measures, such as schedule and cost, in award fee plans; (2) better align its award fee policy with DOD's March 2006 guidance on award fees; and (3) link award fee criteria, as much as possible, to performance measures that focus on identifiable interim outcomes, discrete events, or milestones.

We provided a draft of this report to DOD in October 2007 for its review and comment. In written comments on a draft of this report, DOD concurred or partially concurred with 12 of our 13 recommendations. DOD did not concur with our recommendation regarding defining closure requirements and developing accurate and realistic closure cost estimates for each of DOD's chemical demilitarization sites. DOD recommended that we delete it, since DOD officials believe that a subsequent recommendation defining all contract requirements, including those associated with facility closure activities, was more encompassing. Based on DOD's comments, rather than deleting the recommendation, we clarified it and the related recommendation to more clearly distinguish the

---

difference between the two recommendations, and consolidated it with our two other recommendations related to defining contract requirements. DOD also stated that the department will continue to use acquisition management tools and discipline to ensure the destruction of the United States' chemical weapons stockpile in a safe and secure manner, while being economical and meeting the U.S. commitments under the CWC. DOD identified a number of actions that it already has initiated in response to our recommendations. DOD also provided us with technical comments, which we incorporated in the report as appropriate. DOD's response is reprinted in appendix III.

---

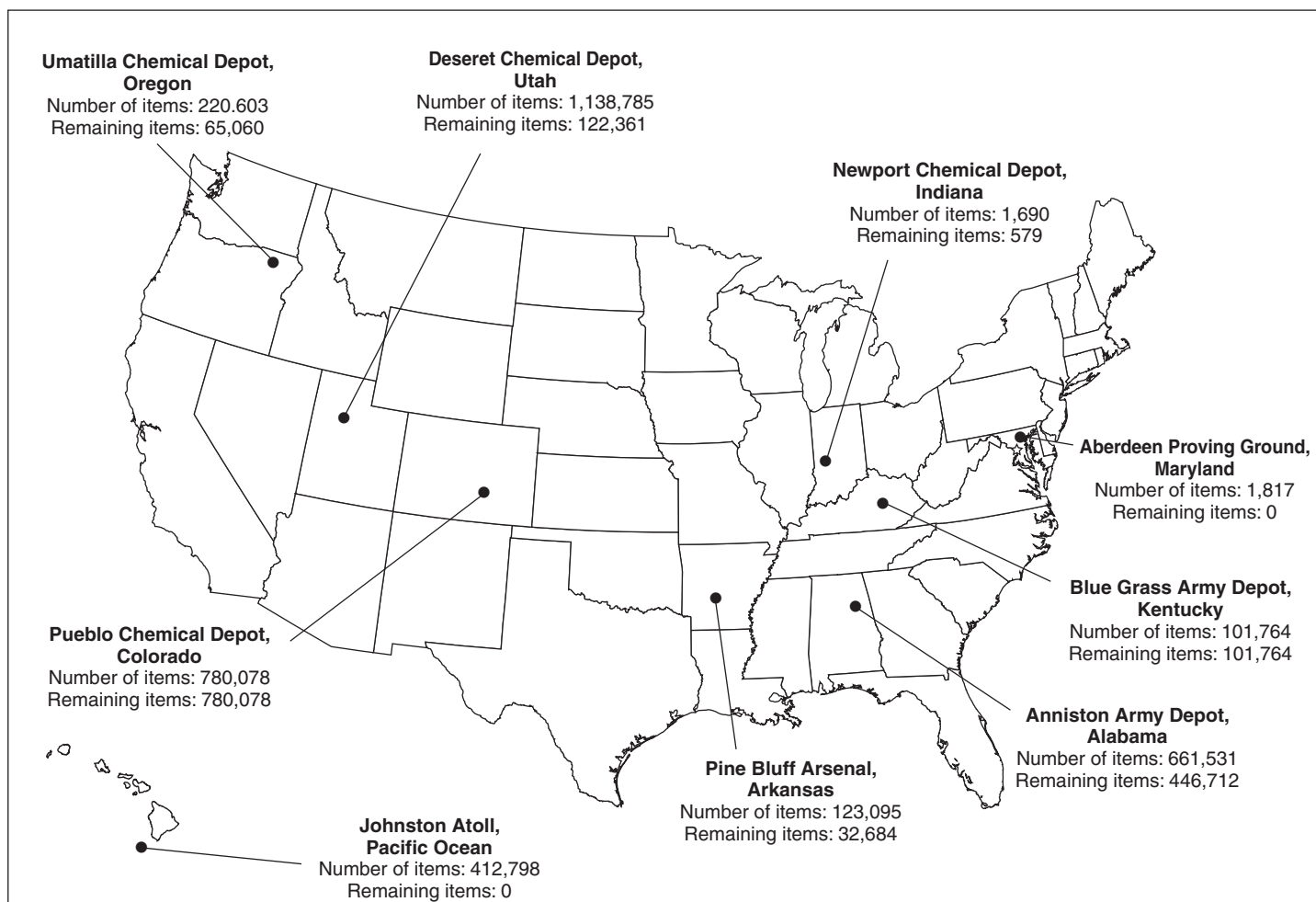
## Background

In 1985, Congress directed DOD to destroy the U.S. stockpile of lethal chemical agents and munitions in the United States.<sup>14</sup> DOD designated the Department of the Army as its executive agent for the program, and the Army established the Chemical Demilitarization Program, which was charged with the destruction of the original stockpile at nine storage sites. Figure 1 shows the locations of the nine storage sites; the number of items, such as projectiles, rockets, mortars, land mines, and bombs, originally stored at each site; and the number of items remaining to be destroyed as of September 30, 2007.

---

<sup>14</sup>The Department of Defense Authorization Act for Fiscal Year 1986, Pub. L. No. 99-145, § 1412(a) (1985).

**Figure 1: U.S. Stockpile of Chemical Agents and Munitions**



Source: GAO analysis of CMA data.

The remaining U.S. stockpile, as of June 2007, consists of two nerve agents—GB and VX<sup>15</sup>—and a blister agent—mustard<sup>16</sup>—which currently

<sup>15</sup>Nerve agents are the most toxic and rapidly acting of known chemical warfare agents. GB, also known as sarin, and VX are human-made lethal chemical warfare nerve agents that affect the nervous system by interfering with the signals sent from the brain to vital organs.

<sup>16</sup>Blister agents include mustard, which is a type of chemical warfare agent and powerful irritant that causes blistering of the skin and mucous membranes on contact.

---

are stored at seven sites in the continental United States. Incineration was initially selected as the method to destroy the stockpile at all nine sites, and destruction began in 1990 at Johnston Atoll. This location was selected to be the operational prototype facility to test the destruction process prior to it being conducted in the continental United States. Figure 2 shows an example of a chemical agent disposal facility like those used at the four operational incineration sites (Anniston, Pine Bluff, Tooele, and Umatilla).

**Figure 2: Umatilla Chemical Agent Disposal Facility, Umatilla Chemical Depot, Oregon**



Source: Umatilla Chemical Agent Disposal Facility.

Subsequent to the decision to use incineration to destroy the remaining stockpile, Congress directed DOD to evaluate the possibility of

---

using alternative technologies to incineration.<sup>17</sup> In 1994, the Army initiated a project to develop nonincineration technologies for use at the two bulk-agent-only sites at Aberdeen and Newport. These sites were selected in part because their stockpiles were relatively simple—each site had only one type of agent and this agent was stored in bulk-agent (ton) containers, which are used to store various chemical agents at the chemical agent destruction sites.<sup>18</sup> Figure 3 shows a ton container being transported to the processing building at Newport.

---

<sup>17</sup>Pub. L. No. 104-201, § 142 (1996).

<sup>18</sup>Since the 1930s, the Army and the chemical industry have used ton containers to store and ship bulk chemicals, including chemical agent. Equivalent in length and diameter to two stacked 55-gallon drums, a ton container weighs approximately 1,600 pounds and measures nearly 7 feet in length.

**Figure 3: Delivery of a Ton Container to the Processing Building at the Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana**



Source: Newport Chemical Agent Disposal Facility.

---

In 1997, DOD approved pilot testing of a neutralization technology at these two sites. Figure 4 shows the type of hydrolysate-filled intermodal storage containers used at Newport. The hydrolysate is awaiting final disposition.<sup>19</sup>

---

<sup>19</sup>The stockpile at the Newport Chemical Depot, Indiana, is the first U.S. stockpile containing VX that will be destroyed by using neutralization—a process that mixes hot water and sodium hydroxide (a caustic chemical) with VX to change the chemical composition to a less toxic form. The resulting by-product is a liquid wastewater commonly referred to as hydrolysate that consists mostly of water but also has a caustic component and organic salts that need further treatment to meet CWC requirements and to meet federal and state environmental requirements for disposal. The hydrolysate is being stored in intermodal storage containers on-site until a post-treatment plan can be implemented. For additional information on the disposal of hydrolysate, see GAO, *Chemical Demilitarization: Actions Needed to Improve the Reliability of the Army's Cost Comparison Analysis for Treatment and Disposal Options for Newport VX Hydrolysate*, [GAO-07-240R](#) (Washington, D.C.: Jan. 26, 2007).



---

**Figure 4: Intermodal Storage Containers at the Newport Chemical Agent Disposal Facility, Newport Chemical Depot, Indiana**



Source: Newport Chemical Agent Disposal Facility.

Also in 1996, Congress directed DOD to evaluate the use of alternative technologies and suspended incineration planning activities at Blue Grass and Pueblo, two sites with assembled weapons.<sup>20</sup> Furthermore, Congress directed that these two sites be managed in a program independent of the Army's Chemical Demilitarization Program and report to DOD directly instead of the Army.<sup>21</sup> Thus, the ACWA program was established.

Table 1 shows DOD's nine chemical agent stockpile sites; the primary destruction method used (i.e., incineration or neutralization) and the

---

<sup>20</sup>Pub. L. No. 104-201, § 142 (1996).

<sup>21</sup>Pub. L. No. 105-261, § 142 (1998).



secondary disposal method used for the treatment of the resulting wastewater, if applicable; the types of munitions destroyed, such as projectiles, rockets, mortars, land mines, and bombs in addition to ton containers; the types of agents (GB, VX, and mustard) and their status (e.g., destroyed, ongoing destruction, or planned destruction); the original agent tonnage; the tonnage destroyed; the percentage of the stockpile destroyed; the remaining agent tonnage; and the status of each facility (closed, operational, or under construction) as of September 30, 2007.

**Table 1: Status of DOD's Chemical Agent Stockpile Sites and Chemical Agent Destroyed as of September 30, 2007**

Site	Destruction method	Munition types destroyed	Type of agent and status <sup>a</sup>	Original agent tonnage	Tonnage destroyed	Percentage of stockpile destroyed	Remaining agent tonnage (as of September 2007)	Facility status
Johnston Atoll	Incineration	Projectiles, land mines, mortars, and ton containers	GB, VX, and mustard (destroyed)	705 <sup>b</sup>	705	100	0	Closed
Tooele	Incineration	Ton containers, mines, rockets, projectiles, spray tanks, and mortars	GB and VX (destroyed) and mustard (ongoing)	13,617	9,292	68	4,325	Operational
Anniston	Incineration	Rockets and projectiles	GB (destroyed), VX (ongoing), and mustard (planned)	2,254	726	32	1,528	Operational
Umatilla	Incineration	Rockets, bombs, and projectiles	GB (ongoing) and VX and mustard (planned)	3,719	1,016	27	2,703	Operational
Pine Bluff	Incineration	Rockets and ton containers	GB (destroyed) and VX and mustard (planned)	3,850	484	12	3,366	Operational
Aberdeen	Neutralization and off-site treatment of wastewater	Ton containers	Mustard (destroyed) and off-site wastewater treatment (complete)	1,622	1,622	100	0	Closed

Site	Destruction method	Munition types destroyed	Type of agent and status <sup>a</sup>	Original agent tonnage	Tonnage destroyed	Percentage of stockpile destroyed	Remaining agent tonnage (as of September 2007)	Facility status
Newport	Neutralization and off-site treatment of wastewater	Ton containers	VX (ongoing) and off-site wastewater treatment (ongoing) <sup>c</sup>	1,269	587	46	682	Operational
Pueblo	Neutralization and on-site biotreatment of wastewater	Projectiles and mortars	Mustard (planned)	2,611	0	0	2,611	Destruction pilot plant under construction
Blue Grass	Neutralization and on-site water oxidation of wastewater	Rockets and projectiles	GB, VX, and mustard (planned)	523	0	0	523	Destruction pilot plant under construction
<b>Total</b>				<b>30,170</b>	<b>14,432</b>	<b>48</b>	<b>15,738</b>	

Source: DOD.

Note: The Non-Stockpile Chemical Materiel Project is the CMA organization responsible for all chemical warfare materiel that resides outside of a declared stockpile. This materiel consists of chemical agent identification sets, which consist of glass ampoules, vials and bottles of chemical agent, and actual chemical weapons. The project provides centralized management and direction to DOD for the disposal of nonstockpile chemical warfare materiel in a safe, environmentally sound, and cost-effective manner. It is responsible for destroying the nerve agents GB and VX in projectiles, vials, bottles, glass ampoules, and ton containers. As of June 2007, the Non-Stockpile Chemical Materiel Project had destroyed 563 tons of chemical agent, which is counted toward meeting the CWC 45 percent destruction milestone.

<sup>a</sup>The stockpile includes two nerve agents (GB and VX) and a blister agent (mustard).

<sup>b</sup>The site at Johnston Atoll destroyed 1,326 tons of agent before the CWC entry into force in 1997. Overall, the site at Johnston Atoll has destroyed a total of 2,031 tons of agent.

<sup>c</sup>On January 5, 2007, CMA began shipping Newport VX hydrolysate to a commercial wastewater treatment facility in Port Arthur, Texas. Because the VX hydrolysate is being transported to Texas for final treatment, the United States receives credit for destruction of the Newport stockpile under CWC. Of an estimated 1.8 million gallons of VX hydrolysate at Newport, as of June 2007, approximately 33 percent has already been shipped to Texas for incineration.

In 1997, the United States ratified the CWC, which prohibits the use of these weapons and mandates the elimination of existing stockpiles by April 29, 2012, which represents a 5-year extension from the initial deadline.<sup>22</sup> The CWC also contains a series of interim deadlines applicable

<sup>22</sup>The CWC implementing legislation provides the statutory authority for domestic compliance with the convention's provisions. See Pub. L. No. 105-277, Division I (1998).

---

to the U.S. stockpile<sup>23</sup> for destroying 1 percent, 20 percent, and 45 percent of the stockpile. The United States met the 1 percent and 20 percent destruction deadlines, but did not meet the original 45 percent destruction deadline. The United States received an extension from April 2004 to December 2007 for the 45 percent deadline. As of June 2007, program officials reported that 45 percent of the U.S. stockpile had been destroyed, 6 months earlier than the interim CWC deadline for destroying that amount, and the entire stockpile at two of the nine sites has been eliminated.

DOD designated the Chemical Demilitarization Program as a major acquisition program.<sup>24</sup> As such, the overall program cost and schedule—and its milestones for major phases of the program—are identified in the APB and are reported to Congress in the SAR. Additionally, the Army, through its CMA, developed program estimates that include schedule milestones to support its day-to-day management responsibilities of the program. Finally, systems contractors that operate the chemical agent destruction facilities have established schedule milestones for completing major phases identified in their individual contracts with the Army.

From 1998 through 2005, the total program cost estimates increased by 113 percent, resulting in the program breaching approved program baselines in 2001 and 2005. As a result, the program was required to certify to Congress in each instance that new cost estimates were reasonable and that the management structure is adequate to manage and control costs. The bulk of these program costs will go to systems contractors that construct and operate the facilities that destroy the chemical weapons.

---

<sup>23</sup>This report solely focuses on the weapons the convention defines as category 1, which are the most dangerous chemicals in the stockpile.

<sup>24</sup>In 2004, DOD split the Chemical Demilitarization Program into three major defense acquisition programs: (1) all CMA chemical agent destruction sites, except for the Newport site; (2) the Newport site; and (3) the ACWA program.

---

## DOD and the Army Have Taken Steps to Strengthen Program Management, but Have Not Fully Developed an Integrated Approach for Measuring Performance and Managing Risk

DOD and the Army have taken steps in addressing our prior recommendations to strengthen program management by establishing an overall strategy and supporting implementation plans, but some key elements related to performance measures and risk management are not fully developed or implemented. DOD and the Army have identified a number of risks across the program that could affect the program's cost and schedule, and CMA has developed a risk management plan, but the program's risk management approach has not been effective because it has not been fully implemented or integrated across the program. Moreover, while DOD and the Army have established key program goals, performance measures have not always been linked to these goals.

---

## DOD Addressed GAO's Prior Recommendations by Establishing Strategic and Supporting Implementation Plans

DOD has taken a number of actions to address our past recommendations that it establish strategic and supporting implementation plans. We recommended in 2003 that DOD and the Army develop an overall strategy and implementation plan for the chemical demilitarization program that would articulate a program mission statement, identify the program's long-term goals and objectives, delineate the roles and responsibilities of all DOD and Army offices, and establish near-term performance measures.<sup>25</sup> We also recommended that DOD and the Army implement a risk management approach that anticipates and influences internal and external factors that could adversely affect program performance. DOD concurred with our recommendations and has strengthened program management by establishing an overall strategy and supporting implementation plans.

In response to our 2003 recommendations, DOD and the Army have developed various strategic and supporting plans. For example, in June 2005, DOD published the *Strategic Plan for Destruction of Lethal*

---

<sup>25</sup> [GAO-03-1031](#).

---

*Chemical Agents and Munitions.*<sup>26</sup> The purpose of this plan is to serve as an overarching plan for destruction of the U.S. stockpile of lethal chemical agents and munitions and nonstockpile items. It applies to both portions of the program implemented by CMA as well as the ACWA program. (In this report, we only address the parts of the plan pertaining to the CMA stockpile program.) This plan included many of the elements that we recommended, such as a program mission statement to enhance national security by eliminating chemical warfare munitions while protecting the workforce, the public, and the environment and meeting requirements specified in the CWC. It also included overall goals and objectives and performance measures.

Also, in July 2005, CMA published the *U.S. Army's Chemical Materials Agency Strategic Plan (2005-2010)*. This plan encompasses strategies for all CMA organizational elements and programs—including the chemical stockpile storage program, the Non-Stockpile Chemical Materiel Project, the Elimination of Chemical Weapons program, and the Pine Bluff Arsenal industrial base—together with those of the AWCA program. According to the CMA strategic plan, its purpose is to be a road map for the safe elimination of the U.S. chemical weapons stockpile. This strategic plan articulated program goals and objectives and also described a number of supporting implementation plans that we recommended should be developed, including annual performance plans that would provide performance measures and an integrated risk management plan that would address the program's challenges.

In its July 2005 strategic plan, CMA identified 11 supporting plans that were directly or indirectly related to the stockpile program. According to CMA officials, 9 of the 11 supporting plans had been developed, as of July 2007. These plans include the CMA resource management plan, a risk management plan, and a risk management directorate plan.

The DOD strategic plan articulated four key goals for the Chemical Demilitarization Program: (1) eliminate the stockpile while protecting the

---

<sup>26</sup>Pub. L. No. 108-375 § 931 (2004) directed the Under Secretary of Defense for Acquisition, Technology, and Logistics and the Secretary of the Army to jointly prepare a strategic plan for future activities for the destruction of the U.S. stockpile of lethal chemical agents and munitions. Section 931 further directed that the plan include, at a minimum, realistic budgeting for stockpile destruction and related support programs, contingency planning for foreseeable or anticipated problems, and a management approach and associated actions that address compliance with the obligations of the United States under the CWC treaty and that take full advantage of opportunities to accelerate destruction of the stockpile.

workforce, the public, and the environment, and comply with U.S obligations under the CWC; (2) employ sound business practices to ensure efficient life cycle management of program resources; (3) institute a program of continuous improvement regarding safety, environment protection, efficient operations and maintenance, and facility closure to mitigate risks and to ensure compliance with statutory, regulatory, and policy requirements and decisions; and (4) maintain communications with the public and local and national officials. Performance objectives with the associated performance metrics were developed to address these goals. Table 2 contains some key objectives to meet goals contained in the DOD and CMA strategic plans.

**Table 2: Comparison of Some Key Destruction Objectives Identified in DOD’s Strategic Plan and CMA’s Strategic Plan**

DOD’s Strategic Plan	CMA’s Strategic Plan
Achieve CWC extended 45 percent destruction milestone by December 31, 2007, while ensuring the safety of the workers, the public, and the environment.	Destroy the U.S. stockpile of lethal chemical agents and munitions while meeting the CWC deadlines and containing total life cycle cost by using an integrated risk management approach.
Achieve CWC extended 100 percent destruction deadline by April 29, 2012, while ensuring the safety of the workers, the public, and the environment.	No objective linked to meeting CWC extended deadline by April 29, 2012.
Manage life cycle costs to the program within fiscal resources and consistent with the APB.	No objective linked to meeting the APB.
Develop and institute a risk management culture that ensures that no chemical agent releases, exposures, and accidents occur across the entire demilitarization community.	Meet and maintain Army, state, and federal safety and security standards and environmental laws, regulations, and permit conditions.

Source: GAO analysis of DOD and CMA data.

CMA also jointly issued the program’s *Fiscal Year 2007 Annual Performance Plan* in September 2006.<sup>27</sup> The performance plan contains, among other things, annual goals for meeting the CWC’s December 2007 interim destruction deadline. However, Tooele is the only site that has approved annual plans, which it is implementing. CMA officials stated that they will request annual performance plans from all of the sites for fiscal year 2008. Moreover, the plans lacked some attributes that would make them more useful to decision makers and to Congress. We have previously found that performance plans can be more effective if they (1) use intermediate goals and measures to show progress or contribution to intended results, particularly if it may take years to meet the intended

<sup>27</sup>The performance plan applies to both CMA and the ACWA portions of the demilitarization program. It was the program’s first plan and was issued jointly by both organizations.

---

results; (2) show baseline and trend data for past performance; and (3) permit an agency to convey what it expects to achieve in the long term by including multiyear performance goals in its performance plan.<sup>28</sup> With baseline and trend data, the more useful performance plans provided a context for drawing conclusions about whether performance goals are reasonable and appropriate. By including multiyear performance goals, a performance plan can provide congressional and other decision makers with an indication of the incremental progress the agency expects to make in achieving results. CMA's performance plan only contains goals related to the specified fiscal year and does not show previous years' trends or show how achievement of the specified goals would contribute to the program's long-term goal.

---

**Risk Management Approach Is Not Fully Developed or Integrated, and Some Key Program Goals Lack Clearly Linked Performance Measures**

DOD has partially implemented our recommendations to establish performance measures and implement a risk management approach that anticipates and influences internal and external factors that could adversely affect program performance. Specifically, CMA has not yet completed all the risk management tools identified in its risk management plan or integrated its risk management efforts across sites and organizations. Further, while DOD did establish performance measures as we recommended, some key program goals still lack clearly linked performance measures. Moreover, the program is using four different performance measurement approaches and measurements that are not well-aligned with one another. Without annual performance goals and measures linked with long-term strategic goals, program officials will lack information on the interim progress being achieved and whether corrective action is needed to safely destroy the stockpile by the treaty deadline.

---

<sup>28</sup> GAO, *Agency Performance Plans: Examples of Practices That Can Improve Usefulness to Decisionmakers*, [GAO/GGD/AIMD-99-69](#) (Washington, D.C.: Feb. 26, 1999).

---

CMA Has Made Progress in Developing an Integrated Risk Management Approach but Has Not Completed Its Risk Management Tools and Integration Efforts

As identified in its *U.S. Army Chemical Materials Agency Integrated Risk Management Plan*, CMA has developed a process to identify program-level risks and reports them as part of the Army's *Probability of Program Success Report*.<sup>29</sup> The program office, in conjunction with the site project managers, also has developed a "risk landscape," which is used to capture risks that could affect the operating and closure schedules. However, no programwide approach exists to integrate the risk management efforts at the site, CMA, and DOD levels to ensure that all risks are being addressed in an integrated manner. For example, CMA officials acknowledged that risks that are included in the *Probability of Program Success Reports* and the site risk landscapes were developed independently of each other and thus may not be fully integrated. Also, while the sites were developing risk plans that are at different stages of maturity, CMA has not yet developed a single set of risk management procedures to be used by the site-level project managers and site systems contractors when developing these plans. Lastly, the risks identified in DOD plans and those identified by CMA were not identified as part of an integrated process. CMA officials stated that the risks it identified are an aggregate of some site risks and CMA program-level risks, whereas the risk identified by DOD in its strategic plan represents a general analysis of the major factors that the senior leadership has selected as appropriate for long-term attention. CMA officials stated that CMA is working to establish a formal process for aligning risks among all planning and reporting documents.

Other steps that are needed to fully implement this approach have not been completed. For instance, CMA identified other tools to aid in implementing an overarching risk management program to complete the steps in this process, but these tools have not been fully developed. These tools include a risk trade-off analysis and a risk management information system database. A risk trade-off analysis is normally included in this risk planning step. According to CMA officials, while risk trade-off analyses are discussed in their risk management plan, the program has not formally used this analysis in assessing program risk, and thus this analysis has not been available to help decision makers consider how to address program challenges. For example, while the condition of the stockpile of mustard agent at Tooele was identified as a key program risk, a process was not in place to perform a comprehensive analysis to consider the risks to the

---

<sup>29</sup>The *Probability of Program Success Report* is designed to improve the Army's ability to accurately assess the program's probability of success, and clearly and concisely represent that success probability to leadership.



---

program's cost and schedule if assumptions about the level of mercury contamination were understated. Because the extent of the problem was not discovered sooner, needed facility modifications were delayed, extending the planned operations schedule by 12 months.

CMA has also not completed the development of its integrated risk information management system, which would involve the collection, documentation, and reporting of risk data in support of the steps in the overall risk management process. According to CMA, an initial requirement analysis for the development of an integrated risk information system determined that initially considered in-house solutions would require considerable additional development. A market survey will be conducted to consider external solutions. While a comprehensive risk management approach could manage risks, and CMA is still in the process of developing such an approach, CMA has not established time frames for the completion and implementation of its risk management approach. Without clear expectations for fully developing and implementing its risk management approach within a set time frame, CMA could continue to be limited in its efforts to control some of the issues that have been affecting the program.

#### Some Key Program Goals Lack Clearly Linked Performance Measures

While DOD and the Army have made progress in establishing program goals, we found that some program goals were not linked to one another or to key performance measures, and making such linkages is a practice of leading organizations.<sup>30</sup> For example, in its fiscal year 2007 annual performance plan, CMA had developed an annual performance measure linked to the interim CWC destruction goal of 45 percent by December 2007. However, neither DOD nor CMA nor the Army has developed annual performance measures that are linked to achieving the ultimate goal of destroying the total stockpile at each remaining site by the April 29, 2012, treaty deadline. Additionally, while the Army has recently established annual site goals for chemical agent tons destroyed, these targets have been linked either to Army or DOD schedules that far exceed the extended April 29, 2012, treaty deadline. Without this linkage, it is difficult for program officials to track the progress that the program is making toward its goals, and program officials have little assurance that program activities are linked to program goals.

---

<sup>30</sup>See, for instance, GAO, *Executive Guide: Effectively Implementing the Government Performance Results Act*, [GAO/GGD-96-118](#) (Washington, D.C.: June 1996).

---

The program is using four different performance measurement approaches: the SAR, the Office of Management and Budget's (OMB) Program Assessment Rating Tool (PART),<sup>31</sup> and DOD's and CMA's strategic plans. As this is a major acquisition program, some performance measures related to cost and schedule are contained in the SAR. However, while DOD and CMA officials cited the schedule milestones in the APB as the schedule the program is accountable to, neither the 2006 approved APB, the April 2006 SAR, nor the April 2007 SAR contained schedule milestone dates beyond April 2012, but rather stated that schedule milestones are "to be determined." DOD officials stated that the dates are not included in the APB because it was approved about 1 week before DOD officially announced to Congress that all sites would not meet the extended April 29, 2012, treaty deadline. Although 18 months (as of October 2007) have elapsed since DOD made that announcement, the dates have still not been included in these documents. DOD and CMA officials stated that the milestone dates are still being used for performance tracking despite not being included in the most recent SARs. While the program may have a measurement for tracking progress, its exclusion from the SAR limits program oversight by Congress.

The program also developed additional performance measures beyond those used in the acquisition reporting system. For example, the program developed performance measures in (1) the Office of the Secretary of Defense's (OSD) strategic plan, (2) OMB's PART, and (3) CMA's strategic plan. However, these measures have not always been linked to each other and have not always been linked to key program goals. For example, while the achievement of destruction of the stockpile by the treaty deadline is an overall program goal in both the DOD and CMA strategic planning documents, neither DOD nor CMA has developed annual performance measures that are linked to achieving that goal even though they had established goals linked to the interim 45 percent destruction goal.

---

<sup>31</sup>OMB's PART was developed to assess and improve program performance so that the federal government can achieve better results. A review using this tool helps identify a program's strengths and weaknesses to inform funding and management decisions aimed at making the program more effective. The tool, therefore, looks at all factors that affect and reflect program performance, including program purpose and design; performance measurement, evaluations, and strategic planning; program management; and program results. Because the tool includes a consistent series of analytical questions, it allows programs to show improvements over time, and allows comparisons between similar programs. See Office of Management and Budget, *Program Assessment Rating Tool (PART)*, <http://www.whitehouse.gov/omb/part/>.

---

Leading organizations seek to establish clear hierarchies of performance goals and measures and link these goals and measures for each successive organizational level to the overall program goal.<sup>32</sup> Our analysis of the various performance measures also determined that they were not always linked to one another or tied to key program goals. For example, while OSD identified 14 performance measures that support the four goals contained in the strategic plan that directly relate to the Chemical Demilitarization Program's stockpile program, CMA's performance measures are not always aligned with OSD's performance measures. Also, while OSD identified performance measures that are similar to those tracked by OMB in the PART, two performance measures in the PART are not included in OSD's strategic plan. These two measures were the planned cost per ton of agent destroyed against actual cost and the statistical confidence of meeting the 45 percent CWC deadline. The SAR contained performance measures related to safety and environmental performance, such as those related to chemical exposures and releases, but did not have performance measures related CWC tonnage goals. Table 3 compares measures identified in the PART, the OSD strategic plan, the CMA strategic plan, and the SAR.

---

<sup>32</sup> [GAO/GGD/AIMD-99-69](#).

**Table 3: Comparison of Performance Measures Identified in the PART, OSD Strategic Plan, CMA Strategic Plan, and Selected Acquisition Report**

OMB PART measures	OSD strategic plan	CMA strategic plan	SAR (CMA and Newport)
Number of chemical agent exposures	No chemical agent exposures as defined in the APB	Number of chemical exposures as defined in the APB	Number of chemical agent exposures
Number of chemical agent releases	No chemical releases as defined in the APB	Number of chemical agent releases as defined in the APB	Number of chemical agent releases
Tons of chemical agent destroyed against CWC 45 percent destruction deadline	Percentage of actual amount of stockpiled chemical materiel destroyed against CWC 45 percent destruction deadline	No tonnage destroyed performance measure against CWC 45 percent destruction deadline	No CWC tonnage destroyed performance measure
Tons of chemical agent destroyed against CWC 100 percent destruction deadline	Percentage of actual amount of stockpiled chemical materiel destroyed against CWC 100 percent destruction deadline	No tonnage destroyed performance measure against CWC 100 percent destruction deadline	No CWC tonnage destroyed performance measure
Recordable incidence rate	Recordable incidence rate	Recordable incidence rate	Meet Army, state, and/or federal requirements
Percentage of stockpile destroyed against CWC 45 percent destruction deadline	No related measure	Statistical confidence in achieving CWC 45 percent destruction deadline	No related measure
Planned cost per ton of agent destroyed against actual cost	No related measure	Plan cost per ton of agent destroyed against actual cost	No related measure

Source: GAO analysis of DOD and CMA data.

This lack of integration between key program goals and performance measures hampers program officials' ability to effectively track the progress that the program is making because the performance plan lacks destruction goals, approaches, and milestones that are directly linked to overall program goals for safely meeting CWC deadlines.

---

## Recently Improved Destruction Rates for Chemical Munitions May Indicate Overly Conservative Schedule Milestones at the Four Incineration Sites

Since DOD extended the program office schedules and DOD schedule milestones in 2005, actual processing rates have considerably exceeded the forecasted rates at the four incineration sites, indicating that schedule milestones being used to measure the program's progress may be too conservative to be realistic. DOD's Chemical Demilitarization Program schedule has been extended in recent years largely because of slower-than-expected processing rates for destroying chemical agent-filled munitions. Program office schedules were extended in 2005 because of a greater recognition of slower processing rates for destroying chemical munitions than schedule milestones adopted in the more optimistic 2003 APB. In addition, the program office employed a new schedule forecasting methodology that also contributed to the schedule extensions because it accounted for more equipment downtime and for the risks that have delayed processing in the past. The schedule extensions exceeded the existing 2003 baseline and led DOD to adopt new schedule milestones in 2006. Finally, program confidence levels for meeting the April 29, 2012, CWC milestone are low.

---

## Slower-Than-Anticipated Processing Rates and Time Frames Led to Schedule Extensions

The program office schedules have been extended since 2003 largely because forecasted processing rates for destroying chemical agent-filled munitions were reduced based on the program's analysis of historical processing rates being slower than anticipated. Our review of best practices indicates that estimating assumptions should be realistic and backed by historical data to minimize uncertainty and risk.<sup>33</sup> Best practices also stipulate that estimates are accurate when they are not overly conservative or optimistic. Best practices also recommend that when underlying data or other assumptions change, cost and schedule estimates should be revised to reflect the current status. According to program officials, previous program office schedule estimates developed in the early 2000s were based on assumptions about processing rates derived largely from peak processing experiences at Johnston Atoll, which began operations in 1990, and early munitions processing campaigns at Tooele—the first two sites in operation. According to CMA officials, program office schedule estimates used from 2001 to 2003 were derived from using the 5 best weeks of these two sites' production rates. The program's assumption was that the follow-on sites, which were similarly designed, would be able to achieve these rates because of the program's years of experience with the various munitions and agents. Program officials said that in practice

---

<sup>33</sup> [GAO-07-1134SP](#).

---

those rates were achievable only for short periods and were not sustainable because of problems with individual munitions, such as difficulty in draining the agent (much slower than assumed), equipment jams, and processing restrictions specified in facility operating permits.

---

### New Schedule Methodology Includes More Time for Downtime and Processing Risks

The program office adopted a new schedule development methodology in 2004 that not only used modeling to determine processing rates, but gave greater recognition to the issues that cause delays, such as plant downtime days for equipment maintenance and the inclusion of risks, such as those associated with the unexpected condition of the stored munitions that further extended the schedule. While previous schedule estimates were point estimates, in that a single processing rate was developed and used for each campaign and the individual campaigns were added together, statistical modeling was used to develop a distribution of different schedule outcomes. Processing rates were evaluated by munitions type, such as projectiles, rockets, and mines, to develop a histogram of daily processing outcomes.<sup>34</sup> These results were used as part of the modeling inputs. For current estimates, unlike past estimates, schedule estimators also collected data on issues that had caused processing delays in the past and identified possible impacts on the schedule and probabilities of occurrence.

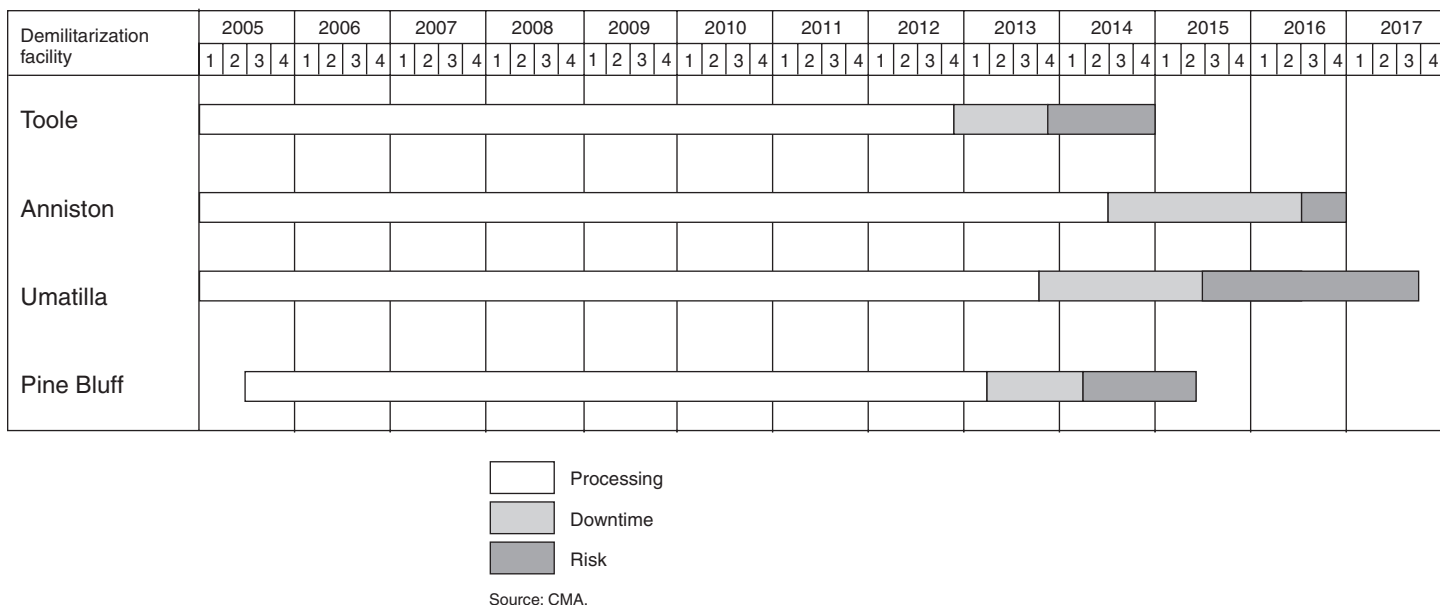
Data were also collected on past program incidents that had caused sites to remain idle for extended periods, and the estimators also developed probabilities for these “downtime events.” The model was run to produce a distribution of 5,000 schedule outcomes. The median result—referred to as the 50 percent confidence level—was selected as the program office schedule estimate. Selection of the median result was also considered conservative, since the previous program office schedules have used the mode, which is the outcome that happens most frequently. According to schedule estimators, the median result is typically to the right of or longer than the mode.

Thus, when the schedule estimates were updated in 2005 using the median schedule outcomes, they were not only more conservative, but also considered more realistic. Figure 5 shows how processing rates, downtime, and risk contributed to the schedule estimate.

---

<sup>34</sup> A histogram is a graphical display of tabulated frequencies.

**Figure 5: 2005 Program Office Schedule Estimates by Processing Rates, Downtime, and Risk**



## Program Office Schedule Extensions Led to Revised Program Baseline

When these schedule estimates exceeded the schedule milestones contained in the April 2003 APB and resulted in major changes to the life cycle cost estimates, an acquisition-related process was initiated to develop new schedule milestones. The new schedule estimate was approved by the Army Cost Review Board in May 2005 and resulted in the new Army Cost Position. Concurrently, DOD was also conducting a program review through its Defense Acquisition Board process that would result in new schedule estimates to be included in the program's Approved Acquisition Program Baseline. As part of this process, the DOD's Cost Analysis Improvement Group (CAIG) developed independent schedule estimates.<sup>35</sup> CAIG's schedule forecasts were also based on modeling to select the median outcome. Unlike those based on the program rebaselining that occurred from 2001 to 2003, the program office schedule estimates and those developed by CAIG were relatively close in most

<sup>35</sup>The OSD CAIG has specific responsibility for providing independent cost estimates when requested by the Under Secretary of Defense for Acquisition, Technology, and Logistics in support of major milestone decision points (Milestone B, Milestone C, or the full-rate production decision review). Overall, CAIG serves as the principal advisory body to the Milestone Decision Authority on all matters concerning an acquisition program's life cycle cost.

cases. The schedule milestones in the 2003 APB are compared with those in the 2005 Army and DOD schedule estimates in table 4.

**Table 4: Comparison of Estimated Operation Completion Dates**

Site	2003 Acquisition Program Baseline	2005 Army program office estimate	Difference from 2003 Acquisition Program Baseline	2005 DOD independent estimate	Difference from 2003 Acquisition Program Baseline	Program current estimate
Anniston	May 2011	September 2016	64 months	June 2016	61 months	May 2015
Newport	July 2005	October 2011	75 months	February 2012	73 months	October 2009
Pine Bluff	November 2009	January 2015	62 months	November 2015	72 months	June 2013
Tooele	February 2008	October 2014	80 months	September 2015	91 months	November 2014
Umatilla	January 2011	June 2017	77 months	March 2017	74 months	December 2014

Source: GAO analysis of DOD and CMA data.

## Recently Improved Processing Rates May Make the Current Schedule Milestones Overly Conservative, but Program Confidence Levels for Meeting Treaty Milestones Are Low

Our review of processing rates that have been achieved at the sites since the program office estimates were developed in 2005 determined that most sites are significantly ahead of the program office estimate for recently completed munition campaigns, indicating that schedule milestones being used to measure the program's progress may be too conservative to be realistic. For example, the 2005 program office schedule forecasted that Umatilla would complete destruction of its 91,442 sarin nerve agent rocket munitions by August 2007. Those operations were actually completed in August 2006—about 12 months ahead of the program office 2005 estimate. This processing rate was achieved despite delays to the site operator internal schedule related to the unanticipated fires associated with some of the rockets. Additional progress made through May 2007 has placed Umatilla about 1,184 days ahead of 2005 program office schedule estimate. We found similar occurrences at the other incineration sites, and actual and near-term projected performance by sites reveals that significant schedule progress has been made since the 2005 schedule-estimating process. Table 5 shows actual and projected schedule savings as compared to the 2005 program office estimated schedule for campaigns recently completed or under way.



**Table 5: Number of Days Saved per Site since 2005 Program Office Schedule Estimates**

Site	Cumulative days saved	Actual or projected days saved	End date of last completed campaign completed to date	Campaigns ongoing and completed or started and completed from May 2005 through July 2007
Anniston	443	Actual	March 8, 2007	GB 8-inch projectiles GB 155-mm projectiles GB M360 105-mm projectiles VX M55 rockets/warheads
Newport	658	Projected	December 2, 2009 <sup>a</sup>	VX agent neutralization
Pine Bluff	375	Actual	May 19, 2007	GB M55 rockets/warheads
Tooele	61	Actual	August 17, 2006	VX land mines Agent changeover
Umatilla	1,184	Actual	January 24, 2007	GB M55 rockets/warheads GB MC-1 bombs GB MK-166 bombs GB 8-inch projectiles GB 155-mm projectiles
Aberdeen	750	Actual	February 13, 2006	Ton container cleanout
<b>Total</b>	<b>3,471</b>			

Source: GAO analysis of Army data.

<sup>a</sup>Figures listed above for Anniston, Pine Bluff, Tooele, and Umatilla represent actual savings. Figures for Newport are projected savings for current ongoing campaigns based on the historical processing rates at those sites. The Newport forecast for completing the current campaign is December 2009.

We calculate that to date, almost \$1.3 billion in cost savings has accrued based on schedule savings since the 2005 program office estimates were established. Table 6 shows actual and projected schedule savings as compared to the 2005 estimated schedule savings for campaigns recently completed or under way.

**Table 6: Potential Operational Cost Savings Associated with Days Saved since 2005 Schedule Estimate**

Dollars in millions		
Site	Cumulative days saved	Potential cost savings
Anniston	443	\$178
Newport	658	227 <sup>a</sup>
Pine Bluff	375	144
Tooele	61	25
Umatilla	1,184	452
Aberdeen	750	236
<b>Total</b>	<b>3,471</b>	<b>\$1,262</b>

Source: GAO analysis of Army data.

Note: Time savings were converted to a cost by using the average fiscal year 2005 and fiscal year 2006 budgets expressed in dollars per day.

<sup>a</sup>Figures listed above for Anniston, Pine Bluff, Tooele, and Umatilla represent actual savings. Figures for Newport are projected savings for current ongoing campaigns based on the historical processing rates at those sites. The Newport forecast for completing the current campaign is December 2009.

The April 2007 SAR for the CMA sites (including Newport) reported new program office schedule estimates, which were a significant improvement from the Army's 2005 program office schedule estimates that generated the program's rebaselining and also were significantly ahead of the independent DOD schedule estimates that are used as the program's unofficial schedule baseline and were developed by CAIG. Table 7 shows the number of months that the estimated schedule for completing operations has improved from 2005 to 2007.

**Table 7: Number of Months of Improvement in 2007 Program Current Estimate for Operations Completion versus 2005 Army Program Office Estimate and 2005 DOD Independent Estimate**

Site	2005 Army program office estimate	2005 DOD independent estimate	2007 program current estimate	Improvement from 2005 program office estimate	Improvement from 2005 independent DOD estimate
Anniston	September 2016	June 2016	May 2015	16 months	13 months
Newport	October 2011	February 2012	October 2009	24 months	28 months
Pine Bluff	January 2015	November 2015	June 2013	19 months	29 months
Tooele	October 2014	September 2015	November 2014	(1 month)	10 months
Umatilla	June 2017	March 2017	December 2014	30 months	27 months

Source: GAO analysis of DOD and CMA data.

In addition to its annual schedule update process, CMA tracks on a monthly basis the confidence levels of achieving various program schedule estimates. CMA tracks these levels after updating its model to incorporate updated processing rates and any changes to estimates for downtime or risk. These updates have shown upward trends in the confidence level, which is the percentage of schedule outcomes that meet or exceed a given date. As previously discussed, the 2005 program office estimate reflected a 50 percent confidence level. By the end of fiscal year 2006, which was about 18 months after the 2005 program office estimates were developed, only Tooele, at 48 percent, was slightly below the 50 percent confidence level. The other three sites' confidence levels for achieving the 2005 program office estimate for completing operations had increased significantly, ranging from 71 percent at Anniston to 83 percent at Umatilla. Moreover, confidence levels based on monthly updates conducted in April 2007 showed that the program office estimates for meeting the DOD schedule milestones were as high as 98 percent for completing operations, but confidence levels were very low for meeting the April 29, 2012, treaty deadline, as shown in table 8.

**Table 8: CMA Assessed Confidence in Achieving DOD Schedule Milestone and April 29, 2012, Treaty Deadline**

Percentages		
Site	Program's assessed confidence in achieving operations schedule milestone	Program's assessed confidence in sites completing destruction by April 29, 2012, CWC milestone
Anniston	73	5
Newport	98	98
Pine Bluff	81	19
Tooele	42	1
Umatilla	84	2

Source: CMA.

While the program office has updated its schedule estimates to reflect the latest processing rates and changes to other assumptions, resulting in schedule improvements in excess of 18 months in most cases, independent schedule estimates have not been developed since the CAIG 2005 estimates because these estimates are usually performed in conjunction with program rebaselining because of schedule or cost growth. Also, when schedules or other assumptions change, cost and schedule estimates should be revised to reflect current status. Because these steps have not been taken, DOD and Congress can have little confidence that the program is being held accountable to a reasonable baseline to measure program progress and that program costs are reasonable.

## Shortcomings in Underlying Cost Data Make Earned Value Management Results Unreliable and Limited Our Ability to Determine Cost Estimate Reliability

Because of shortcomings in the underlying data, the usefulness of the EVM data to make cost projections is limited, which makes results unreliable, and our ability to independently verify and validate the reliability of the cost estimates was restricted. The Chemical Demilitarization Program's projected cost growth is largely attributable to longer schedules and increased costs associated with facility closure estimates. Shortcomings in the underlying data include invalid and unstable performance baselines. The performance baselines are problematic because all requirements, such as closure costs, are not fully identified and included in program cost estimates and because large amounts of additional costs are added to the performance baseline annually. Moreover, there were significant differences between the systems contractor cost estimates through completion and the government cost estimates through completion because the government anticipates longer operational periods and greater closure requirements.

Projected Cost Growth Is Largely Attributable to Longer Schedules and Increased Facility Closure Estimates

The Chemical Demilitarization Program’s continuing growth in cost estimates is largely attributable to longer schedules and the increased costs associated with plant closure. Longer schedules led to increases in cost estimates for sites currently in the operations phase because of additional labor costs, which are a high percentage of site costs. In addition, according to CMA officials, labor costs are very expensive for this program because of the need for highly specialized labor that cannot be easily replaced. According to these officials, each staff member, for example, must pass the Personal Reliability Program, which provides specialized training and security clearances for working at the chemical deconstruction plants. Program officials have stated that for this reason, it is often more cost-effective during plant shutdowns or extended delays to retain this specialized workforce than to lay off and rehire new staff. This workforce costs approximately \$9.5 million per month based on an average monthly spend rate across the five sites we examined, which means that a 1-month schedule extension could increase the life cycle cost estimates by about that amount. Table 9 shows the increase in program cost as the schedule was extended.

Table 9: Changes in Estimated Total Program Cost				
Then-year dollars in billions				
Source of estimate	2003 APB	2005 Army cost position	Increase	April 2007 SAR
Total life cycle cost estimate	\$19.6	\$29.2	\$9.6	\$28.6

Source: U.S. Army.

While the Chemical Demilitarization Program Is Using Earned Value Management as a Tool, Some Underlying Data Make Results Unreliable

EVM is an important program management tool required by DOD and OMB that measures performance by comparing the value of work accomplished with the value of work planned and the cost of the work performed. Using EVM data, early warning of schedule delays and cost overruns can be determined. EVM uses contractor-reported data to examine variances reported in contractor performance reports between actual cost and time of performing work tasks and the budgeted or

---

estimated cost and time. As a result, DOD and OMB policy and guidance require the use of EVM to measure program performance.<sup>36</sup>

The Chemical Demilitarization Program uses EVM<sup>37</sup> as a tool that allows both government and systems contractor managers to have visibility over cost performance on their contracts. However, the ability of the program's EVM system to reliably manage and forecast the program's cost estimates may be affected by large variances between the systems contractors' estimated cost to complete operations and closure versus the government's estimate; systems contractors' baselines that have not been carefully controlled, leading to high percentages of authorized work that is unpriced for long periods of time; and limited identification of requirements for closure costs at individual sites.

Because of the shortcomings in the underlying cost data, the usefulness of the EVM data to make cost projections is limited and our ability to independently verify and validate the reliability of the cost estimates was restricted. In other words, the mechanics of the EVM system are working properly; however, we found that the performance management baseline does not accurately reflect the remaining life cycle costs of the Chemical Demilitarization Program. DOD's EVM implementation guide states that "the 'to-go' plan should reflect a realistic schedule of how the remaining work actually is to be done and the new budget should be adequate and reflect a realistic estimate, remaining program risks, and contain an appropriate amount of management reserve."<sup>38</sup> According to best practices, an EVM system should be devoid of data errors and anomalies that may distort the analysis.<sup>39</sup> In addition, any cost or schedule variances should be explained and corrective actions identified. Furthermore, the EVM system should have a valid and stable performance baseline from

---

<sup>36</sup>Defense Contract Management Agency, *Department of Defense Earned Value Management Implementation Guide* (Washington, D.C.: Apr. 7, 2005). Also see DOD Memorandum, *Revision to DOD Earned Value Management Policy* (Washington, D.C.: Mar. 7, 2005), and Office of Management and Budget, *Capital Programming Guide* (Washington, D.C.: 2006).

<sup>37</sup>EVM is a process required by OMB that can help program managers track program progress by using the value of work done as a basis for estimating the cost to complete the project.

<sup>38</sup>Defense Contract Management Agency, *Department of Defense Earned Value Management Implementation Guide*.

<sup>39</sup>[GAO-07-1134SP](#).

---

which to make projections and do trend analysis.<sup>40</sup> In the case of the Chemical Demilitarization Program, the cost account managers are inserting their costs into the system properly, system certification verifies that the EVM reported costs match the costs in the accounting system, the EVM reports are being prepared with minimal errors, and cost account managers are explaining any variances. However, the actual data are measured against a baseline that does not reflect all of the work to be performed, such as facility closure activities, which distorts cost and schedule performance metrics. This undermines the effectiveness of the EVM system in providing management with accurate and realistic metrics for making informed management decisions.<sup>41</sup>

---

## Performance Baselines Lacked Validity and Have Been Unstable

Our review showed that the performance baselines lack validity and have not been stable because CMA and site systems contractors have not fully identified all requirements, such as closure costs, and included them in program cost estimates and because large amounts of additional costs<sup>42</sup> are added to the performance baseline annually. EVM guidelines state that once a contract is awarded, the contractor should establish a performance baseline that will serve as a time-phased budget plan for accomplishing work and measuring contract performance.<sup>43</sup> This is essentially the spending plan for the program and should closely equate to the planned budget, which is the value of work planned through the project's completion. The performance baseline should include all costs associated with completing the program, including direct and indirect labor, material, and other direct costs associated with the authorized work. However, we found that each of the sites was lacking a stable and reliable EVM

---

<sup>40</sup>Defense Contract Management Agency, *Department of Defense Earned Value Management Implementation Guide*.

<sup>41</sup>In its technical comments on a draft of this report, DOD expressed concern about our statement that the EVM system used at each site may not be reliable. As a result, the department stated that it will request the Defense Contract Management Agency to conduct an audit of the CMA EVM system beginning no later than June 30, 2008.

<sup>42</sup>The systems contractor and government have identified work that (authorized but unpriced) is negotiated and added to the contract price annually.

<sup>43</sup>Defense Contract Management Agency, *Department of Defense Earned Value Management Implementation Guide*. Also, see [GAO-07-1134SP](#).

---

performance baseline, which hindered our ability to perform an independent EVM analysis.<sup>44</sup>

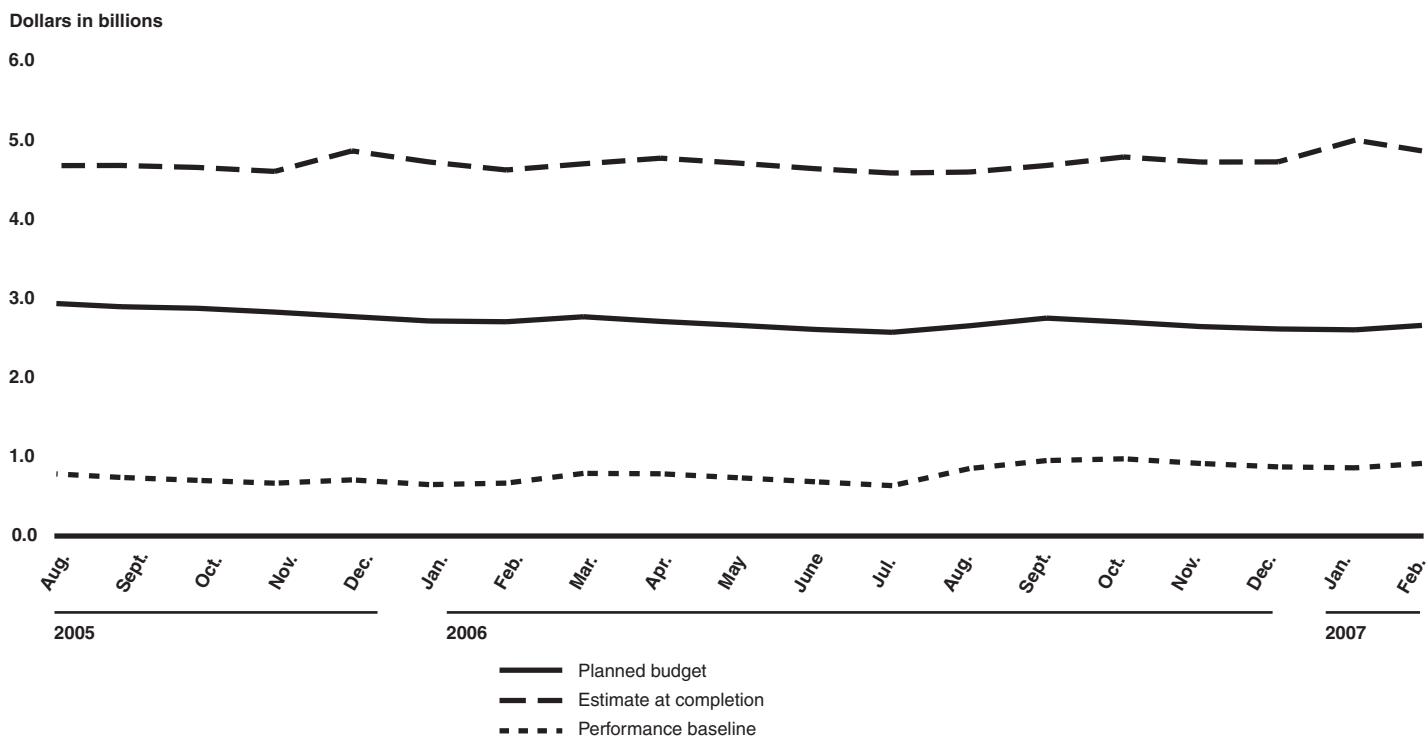
While the planned budget and the performance baseline should closely equate, we found that the performance baseline is significantly less than the planned budget (close to \$2 billion less) because most sites have significant amounts of work that are authorized by the systems contractors and the Army but are not yet placed on contract. For example, the April 2007 SAR reports that while the contract value at Umatilla is \$1.2 billion through December 2006, an additional \$700 million has been authorized but is pending negotiation. Also, the Estimate at Completion (EAC) cost estimate, which represents all estimated costs through the end of the contracts, is \$4 billion more than the performance baseline. Figure 6 shows the extent that planned budget and the EAC exceed the performance baseline for all sites combined over a 19-month period from August 2005 to February 2007.

---

<sup>44</sup>In its technical comments on a draft of this report, DOD expressed concern about our statement that shortcomings in the underlying (EVM) data include invalid and unstable performance baselines. DOD stated that the issues with the contract baselines are issues of program management or risk, not issues of EVM data or process reliability. DOD stated that this problem has been ameliorated by the recent completion of life cycle contract negotiations at three of the five sites covered by our report (Anniston, Pine Bluff, and Umatilla). The contract negotiations for Newport and Toole are ongoing and should be completed by June 30, 2008. The department stated that it will request the Defense Contract Management Agency to conduct an audit of the CMA EVM system beginning no later than June 30, 2008.



**Figure 6: Comparison of the Performance Baseline with the Planned Budget and Systems Contractors' Estimate at Completion**



Source: GAO analysis of Army data.

The performance baseline does not include all requirements, such as closure costs, which are not fully identified and included in program cost estimates. Best practices state that a cost estimate should be comprehensive in order to be considered credible.<sup>45</sup> Systems contractor officials stated that in many instances what was included in their estimated completion costs were placeholder amounts, which they believed to be unrealistic. According to program office officials, the government and the systems contractors have not yet completely defined the requirements for closure, so a realistic closure cost estimate is not currently available. However, since two sites—Johnston Atoll and Aberdeen—have already been closed historical data are now available to

<sup>45</sup>“Comprehensive” means that the cost estimate is complete and accounts for all possible costs. Comprehensive cost estimates completely define the program, reflect the current schedule, and are technically reasonable. See [GAO-07-1134SP](#).

---

develop more accurate closure estimates at the remaining sites.<sup>46</sup> For example, based on the Army's experience of destroying blister and nerve agents at Johnston Atoll, closure costs for other destruction sites are increasing from initial estimates. As a result of incorporating these actual data, assumptions for conducting closure activities have increased from 12 months to about 30 months at some sites.

The performance baseline also is unstable because large amounts of additional costs are added to the performance baseline annually.<sup>47</sup> Each fiscal year, a portion of the unpriced work that is part of the planned budget is negotiated (priced), and it is moved into the performance baseline. The negotiated funding is often greater than what was used as a "placeholder" budget, increasing the contract baseline to more than what was included as unpriced work. For example, the fiscal year 2006 negotiated increase in the contract value at Anniston was \$6 million more than the reduction in authorized unpriced work. Program office officials explained that the performance baseline at each site is constantly changing because of yearly contract renegotiations<sup>48</sup> for future operations and closure costs. Program officials attribute the yearly changes to the contracts using Operating and Maintenance funds, which expire within 1 fiscal year. This situation created the need to put on contract a year's worth of work in conjunction with each fiscal year's appropriation.

CMA officials stated that they are making efforts to stabilize the baseline by placing the full life cycle costs associated with all activities at each site. In its technical comments on a draft of this report, DOD stated that three of the five CMA sites (Anniston, Pine Bluff, and Umatilla) had completed contract performance baselines and negotiations were ongoing at the two remaining sites (Newport and Tooele). DOD expected that the negotiations for these two sites would be completed by June 30, 2008. Once this happens, CMA officials believe that there will be less of a need for annual negotiations and more realistic performance baselines should result. Until program management has a performance baseline that reflects the current plan to complete remaining work and follows a disciplined

---

<sup>46</sup> Johnston Atoll was closed in December 2003 and Aberdeen was closed in May 2007.

<sup>47</sup> The systems contractor and government have identified work that (authorized but unpriced) is negotiated and added to the contract price annually.

<sup>48</sup> The contracts use Operating and Maintenance funds, which are available for obligation for 1 fiscal year. This creates the need to negotiate the contracts on a yearly basis, since each fiscal year's funds are appropriated.

---

process for incorporating changes, management will not be able to benefit from the EVM system's ability to reveal actual program performance and detect program risks.

---

**Program Manager-  
Estimated Completion  
Costs Are Significantly  
Higher Than Completion  
Costs Generated from  
EVM Data, Suggesting  
Data Are Incomplete**

It is a best practice to develop a range of independent EACs using commonly accepted EVM equations because doing so informs management of the likely range of costs for completing the program so appropriate action can be taken.<sup>49</sup> In addition, DOD guidance states that remaining work should reflect a realistic schedule and budget that also reflect remaining risks.<sup>50</sup> Finally, EVM guidelines state that program managers should, at least on a monthly basis, rely on EVM data to generate EACs that are derived based on the cost of work completed to date along with an estimate of what it will cost to complete the rest of the program.<sup>51</sup> By relying on past performance and using well-defined EVM indices, a variety of EACs can be generated. However the EACs generated are only as good as the underlying data in the EVM system.

Based on our analysis, program cost estimates often exceeded the worst case of our range of independently developed completion costs estimates because of shortcomings in the underlying data of the EVM systems maintained at the chemical demilitarization sites. It is a best practice to develop a range of independent cost estimates using commonly accepted EVM equations. Doing so informs management of the likely range of costs for completing the program so that appropriate action can be taken. We found that when we developed independent EACs using the systems contractor's EVM data and commonly accepted EVM forecasting equations in all cases the systems contractors' EACs are either at the upper end of or higher than our estimated EAC range based on our analysis shown in table 10. In addition, the program manager's EAC was far outside of our projected range and, in many cases, was almost twice as high as our EAC. For example, our estimated cost range for Anniston based on the EVM data was from \$1.6 billion to \$1.7 billion. The systems contractor's most likely cost estimate was \$100 million above the upper limit of our range, and the program manager's estimate was \$1.4 billion higher than the upper

---

<sup>49</sup>GAO-07-1134SP.

<sup>50</sup>Defense Contract Management Agency, *Department of Defense Earned Value Management Implementation Guide*.

<sup>51</sup>GAO-07-1134SP.

range limit. We attribute this difference to an understated performance baseline, which is critical to the estimating process. Table 10 compares our independent EAC to that of the systems contractor's and program manager's EACs.

**Table 10: Comparison of GAO's Independent Estimates to Complete Operations and Closure Activities with the Systems Contractor's and Program Manager's Estimates**

Then-year dollars in billions

Site	Original contract cost	Current planned budget	Systems contractor's most likely EAC	GAO's independent EAC range	2006 Selected Acquisition Report program manager's EAC
Anniston	\$0.6	\$1.7	\$1.8	\$1.6–\$1.7	\$3.1
Newport	0.3	1.0	1.1	0.9–1.1	1.8
Pine Bluff	0.5	1.5	1.9	1.4–1.5	2.4
Tooele	0.2	1.6	2.4	1.4–1.6	3.3
Umatilla	0.5	1.8	1.9	1.6–1.8	3.8

Source: GAO analysis of Army data.

In addition, the large difference between the program manager's EAC and our independent EACs indicates that there is more work that is being considered by the program manager. More work, in turn, will affect future costs and requirements than is predicted by the EVM data and, therefore, calls into question the usefulness of the EVM data to effectively manage the program.<sup>52</sup> The ability to respond quickly to program problems depends on having early visibility into what is causing them. Thus, if the EVM performance baseline is missing some of the remaining work, then accurate progress assessments will not be available to provide management with a better picture of program status. This lack of insight may hinder decision making and program success because problems may go undetected.

Without accurate and realistic closure requirements used to develop completion cost estimates, DOD and Congress will not be able to

<sup>52</sup>In its technical comments on a draft of this report, DOD stated that the Army agrees that there is usually more work that is being considered and not yet in the contract baseline. The Army did not agree that this situation affects the EVM data. DOD stated that the Army uses the data to determine current variance and trend information. The data are also used by the systems contractors and CMA program office along with estimates of additional future work to evaluate the life cycle schedule and costs. The department stated that it will request the Defense Contract Management Agency to conduct an audit of the CMA EVM system beginning no later than June 30, 2008.

---

accurately identify and adequately budget for all activities through facility closure. Similarly, without an independent cost review once the cost estimates are complete and schedule milestones have been updated and reviewed, DOD and Congress will not have assurance that cost estimates for the closure of chemical demilitarization sites are realistic.

---

## The Army Has Actively Managed Award Fees and Could Further Emphasize Schedule and Cost and Link Award Fees to More Objective Performance Measures

Our review of the Army's use of monetary fees to incentivize certain aspects of the systems contractors' performance at the five sites in or near beginning operations in 2003 showed that the contract monetary fee structures at the incineration sites differed from those at Newport's neutralization site. Award fees are predominant at the incineration sites while incentive fees are predominant at Newport. We found that while the Army has actively reviewed and adjusted the types of monetary fees used and the criteria and weighting for determining monetary fees, there be may be opportunities to further emphasize schedule and cost. For example, during the period we reviewed, award fees have emphasized safety and environmental compliance at each site, but have not resulted in the control of schedule and cost growth. In fiscal year 2006, after several external organizations recommended that it do so, the Army reinstituted the use of a distinct award fee performance measure for schedule.<sup>53</sup> However, site project managers often weighted schedule at the lower end of the specified range. Also, while DOD has published guidance that award fees should be tied to identifiable interim outcomes, discrete events, or milestones as much as possible, we found that several performance measures, such as management and cost, had evaluation factors that were all or mostly all subjective and were not clearly linked to a measurable outcome. In addition to award fees, in 2005, the Army established the Director's Programmatic Performance Based Incentive (DPPBI), a performance-based incentive fee to encourage the incineration site systems contractors to establish a collaborative relationship with the goal to share lessons learned in areas that would result in schedule reduction across all sites. Before fiscal year 2007, this fee was based on subjective schedule performance measures. By fiscal year 2007, DPPBI had evolved to focus mostly on the sites' collective schedule performance linked to the CWC treaty deadline. It is unclear how effective this incentive fee will be in motivating individual systems contractors' schedule performance due to

---

<sup>53</sup>CMA had previously incentivized schedule as a distinct performance measure in fiscal year 2002 at all four incineration sites and additionally in fiscal years 2000 and 2001 at Tooele.

---

the collective manner in which the fee is earned, its relative size, and recent focus on objective schedule performance. An additional incentive fee, authorized by section 923 of the National Defense Authorization Act for Fiscal Year 2007, provides up to \$165 million at each incineration site for the completion of destruction and facility closure by or close to the CWC deadline. This incentive fee, as planned, is structured to accelerate destruction operations and facility closure at the incineration sites. Because this fee has not yet been implemented, we have no basis at this time to determine how effective this incentive might be at controlling schedule.

---

### Contract Monetary Fee Structures at the Incineration Sites Differ from Those at Newport's Neutralization Site, and Award Fees Are Predominant at the Incineration Sites

CMA uses cost-plus-award-fee contracts with incentive fees to encourage and reward the systems contractors to perform in an innovative, efficient, and effective way in areas deemed important to the program's success. Under these contracts, the systems contractors' allowable, incurred costs are reimbursable to the extent prescribed in the contract. According to CMA officials, the Chemical Demilitarization Program systems contracts are cost reimbursable, based on the fact that it is not possible to accurately describe the requirements in sufficient detail to address the myriad risks and uncertainties associated with destroying aging and deteriorating munitions that are filled with chemical agent. As a result of this high-risk environment, the government accepts most of the cost risk. Thus, when problems arise, such as rocket fires or mercury contamination, government and systems contractor resources are focused on fixing the problems or mitigating the risk rather than fixing blame.

The base fee for this program is a fixed amount of money negotiated at the beginning of each year of contract operations, and is usually paid on a monthly basis to the systems contractor for its performance, though this fee is not tied to specific performance criteria as are the award and incentive fees. According to program officials, the rationale for providing a base fee is due to the program's complexity and to provide the systems contractors with a level cash flow for financial viability. Award fees are intended to motivate systems contractor performance in areas that are susceptible to judgmental and qualitative measurement and evaluation and, as a result, award fee criteria and evaluations tend to be subjective. Typically, award fee contracts emphasize multiple aspects of contractor performance in a wide variety of areas, such as quality, timeliness, technical ingenuity, and cost-effective management.<sup>54</sup> Finally, incentive fee

---

<sup>54</sup>GAO-06-66.

---

contracts use what is considered an objective evaluation of the systems contractor's performance to adjust the fee paid, which usually involves applying a fee determination formula specified in the contract.

The contracts at each of the four operational incineration sites—Anniston, Pine Bluff, Tooele, and Umatilla—include (1) a base fee (representing 3 percent of the negotiated total cost of the contract), which is a fixed amount not subject to performance evaluation; (2) an award fee that is 7 percent of the negotiated contract costs, which will be determined through performance evaluations and paid from an award fee pool; and (3) DPPBI, a performance-based incentive fee established in 2005 and paid from an available fee pool amount that is 2 percent of negotiated contract cost. The contract at the remaining neutralization site—Newport—has a base fee (3 percent), an award fee (3 percent), and a performance-based incentive fee (6 percent).<sup>55</sup> All five contracts had performance-based incentive fees added after initial contract award.

The types and percentages of fees offered to the systems contractors to safely destroy the chemical weapons stockpile differ and emphasize different performance measures. For example, at the incineration sites, the award fee is the predominant fee and, from fiscal year 2003 to fiscal year 2007, this fee has largely emphasized safety and surety, environmental compliance, and management goals. Conversely, at the neutralization site, the performance-based incentive fee is the predominant fee, which has emphasized schedule goals. Figure 7 compares the monetary incentive fees earned by the systems contractors at the incineration sites and at Newport. As shown in figure 7, in fiscal year 2006, CMA paid the systems contractors at the incineration sites a combined total of about \$39.9 million in fees, which consisted of about \$31.1 million (or 78 percent) in award fees and about \$8.8 million (or 22 percent) in performance-based incentive fees. In contrast, CMA paid the neutralization site system contractor at Newport about \$14.7 million in monetary fees, which consisted of about \$2.5 million (or 17 percent) in award fees and upwards of about \$12.1 million (or 83 percent) in performance-based

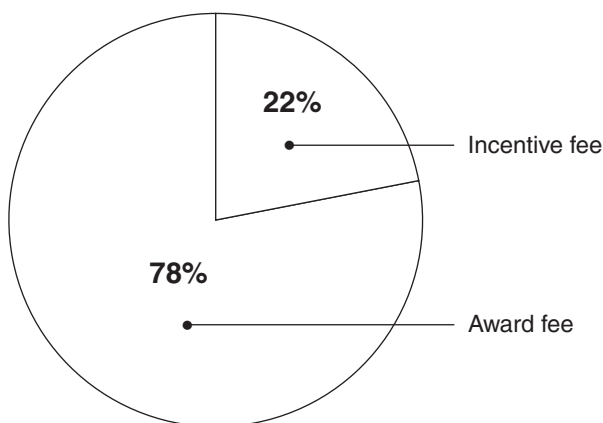
---

<sup>55</sup>The initial actual percentages of the base and award fees for each of these contracts were originally established through the full and open competitions conducted for each of these contracts. Each contractor's proposal included a percentage for both the base fee and the award fee, which the government evaluated as part of the contract selection process. With the exception of one systems contractor, all the contractors proposed a total fee of 10 percent with up to 3 percent proposed for the base fee and the remaining 7 percent allocated to award fee. The one exception is Newport where the contractor proposed a base fee of 3 percent and an award fee of 3 percent.

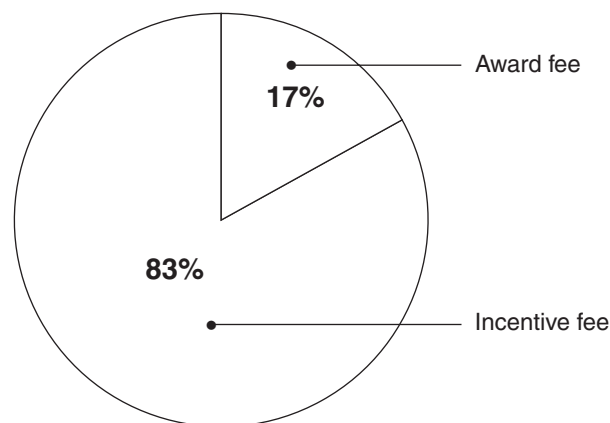
incentive fees. In fiscal year 2006, the award fees earned at each of the incineration sites were almost three times higher than that earned at Newport.

**Figure 7: Comparison of the Monetary Incentive Fees Earned by Systems Contractors at the Incineration Sites and at Newport during Fiscal Year 2006**

Incineration sites' monetary fees for fiscal year 2006: \$39.9 million



Newport monetary fees for fiscal year 2006: \$14.7 million



Source: U.S. Army Sustainment Command.

Note: GAO did not independently verify the award and incentive fee data provided by the U.S. Army Sustainment Command.

By predominately using performance-based incentives at Newport, the Army has aligned more of its monetary fees with objective outcomes. However, Army officials said that it is difficult to determine how effective the usage of performance-based incentive fees has been in motivating the systems contractors to meet schedule and cost milestones because of the number of extensions made to the original incentive agreement. The extensions were made to account for the technical challenges encountered by the systems contractors during the neutralization process. After the terrorist attacks of September 11, 2001, due to Army concerns about security vulnerabilities, CMA restructured the contracts to increase the emphasis on performance-based incentives at the Newport and Aberdeen



---

neutralization sites to incentivize the systems contractors to destroy the remaining stockpile of lethal chemical agent on an accelerated schedule.<sup>56</sup>

---

**Army Actively Managed Award Fees and May Be Able to Further Emphasize Schedule and Cost**

Since 2003, the period of our analysis, the Army has actively reviewed and adjusted criteria for determining monetary fees—largely award fees—it provided to the systems contractors to incentivize aspects of their performance. CMA’s award fee plans generally use performance measures that could be expected to incentivize the desired acquisition outcomes. CMA includes broad aspects of systems contractor performance, such as management performance, and CMA also views these as keys to a successful program. From 2003 through 2006, CMA used safety and surety, environmental compliance, cost, and management as the key performance measures. Until fiscal year 2006, however, CMA did not emphasize schedule as a distinct performance measure in the award fee plans.<sup>57</sup>

**Army Emphasized Safety and Environmental Compliance in Award Fee Plans and Did Not Successfully Incentivize Schedule and Cost Performance**

From fiscal year 2003 through fiscal year 2006, the incineration sites and Newport had not been able to maintain original production schedule milestones and had experienced significant cost growth. Although the management performance measure included some criteria for schedule, during the period from fiscal year 2003 through fiscal year 2005, schedule was not a distinct performance measure in the award fee plan, and safety and environmental compliance were heavily weighted. CMA officials acknowledged in the 2007 incentive agreement plan that while award fees have succeeded in motivating the systems contractors to maintain high levels of safety and environmental compliance at each site,<sup>58</sup> they have not satisfactorily resulted in the control of schedule and cost growth. Many events and constraints contributed to the schedule and cost growth, both within and beyond the systems contractors’ control. CMA officials stated that the process to determine the degree to which such issues cause

---

<sup>56</sup>However, these incentives did not keep the Newport contract on schedule. The systems contractor missed the target completion date for the third of its four performance incentive milestones and the program was delayed by over a year. According to DOD, the failure to meet this milestone was due to unforeseen technical difficulties and could not have been ultimately influenced by any type of contractual language.

<sup>57</sup>Schedule was a distinct performance measure in the Tooele award fee plan for fiscal years 2000 and 2001. In 2002, it was a distinct performance measure in the award fee plans at each of the incineration sites.

<sup>58</sup>CMA officials noted they were acting in accordance with Congress’s mandate that the program shall provide for the maximum protection of the workforce, the public, and the environment. See 50 U.S.C. 1521 (c)(1)(A) (2007).

variances to baselines is never clear, but generally, over the course of a year, there may be 25 percent of the problems that are clearly outside of the control or responsibility of the systems contractor, 10 percent that are clearly within the control of the systems contractor, and 65 percent that fall into the “gray area” where it is difficult to determine whether the problem is clearly outside or within the control of the systems contractor.

From fiscal year 2003 through fiscal year 2006, the Army paid award fees to the systems contractors between 70 percent and 96 percent of the available award fee pools primarily for good-to-outstanding performance in safety and surety, environmental compliance, and management, which collectively constituted most of the basis for determining the award fee. Table 11 shows both the actual amount and the percentage of the total available award fee pool each site was paid by the Army over the period from fiscal year 2003—when all five sites were either in or preparing for the operations phase—to fiscal year 2006. Based on our analysis of this period, the Army paid the systems contractors at three of the four incineration sites award fees between 86 percent and 96 percent of the total award fee pool available during this period. The systems contractor at Tooele was the exception, earning only 70 percent of the total available award fee pool, according to the U.S. Army Sustainment Command, because of unsatisfactory ratings due to the lack of real progress in planning and preparing for the mustard campaign and in not meeting government expectations for managing costs.

**Table 11: Percentage of Award Fees Earned at the Incineration Sites and Newport, from Fiscal Year 2003 to Fiscal Year 2006**

<b>Chemical demilitarization facility</b>	<b>Amount of award fee pool (2003-2006)</b>	<b>Amount of award fee earned (2003-2006)</b>	<b>Percentage of award fee earned (2003-2006)</b>
Anniston	\$24,536,587	\$23,671,150	96
Pine Bluff	22,564,501	19,633,254	87
Umatilla	26,235,256	22,638,970	86
Newport	10,532,717	8,734,713	83
Tooele	27,917,118	19,414,301	70
<b>Total</b>	<b>\$111,786,179</b>	<b>\$94,092,388</b>	

Source: U.S. Army Sustainment Command.

Anniston, for example, earned \$23.7 million (or 96 percent) of the award fee during this period. According to an award fee evaluation board report,

---

while the Anniston systems contractor worked aggressively to implement the schedule without compromising worker or public safety, the systems contractor faced challenges related to disciplined operations.<sup>59</sup> The report noted that certain destruction campaigns at Anniston were characterized by schedule delays that resulted primarily from equipment reliability problems and, at times, inefficient planning and execution of repair efforts. The report further noted that while the efficiency of repairs was at times problematic, the systems contractor could not have prevented the equipment failure. The report also credited the systems contractor's risk mitigation efforts with significantly reducing the risk of a 6-month potential site shutdown that would have carried with it a corresponding cost impact of \$75 million. Thus, CMA was able to justify paying the systems contractor nearly the full amount of available award fee. Also, during one period, Umatilla's systems contractor earned \$2.5 million (or 80 percent) of the available award fee pool while it had destroyed 36 percent of the nerve agent rockets planned for that period. According to an award fee evaluation board report, the processing shortfall was attributable to the systems contractor's lack of implementation of planned and emergent work in an efficient and effective manner, and was estimated to increase the planned operations schedule by 77 days.<sup>60</sup> We have no basis for saying that the systems contractors should not have received their award fees, since they generally were evaluated as having met the award fee criteria, which at the time did not have schedule as a distinct performance measure.

CMA officials have acknowledged that the existing award fee process has not satisfactorily resulted in the control of schedule and cost growth. CMA developed the schedule performance measure in response to Army Inspector General recommendations, and DOD guidance suggested that CMA focus more attention on schedule criteria. The Army's reinstatement of a distinct schedule performance measure coincided with the program's schedule extensions.<sup>61</sup> Also, in fiscal year 2004, according to CMA, the

---

<sup>59</sup>See the *Award Fee Review Board Report for the Anniston Chemical Agent Disposal Facility*, Evaluation Number 17, for the evaluation period from April 1, 2005, to September 30, 2005.

<sup>60</sup>See the *Award Fee Evaluation Board Report for the Umatilla Chemical Agent Disposal Facility*, First Period, Fiscal Year 2005, for the period of performance from October 1, 2004, to March 31, 2005.

<sup>61</sup>Memorandum from the Under Secretary of Defense for Acquisition, Technology, and Logistics on Chemical Demilitarization Program Strategic Governance (Washington, D.C.: Jan. 6, 2006).

---

Army Has Adjusted Award Fee Plans' Weighted Performance Measures and Could Further Increase the Weight of Performance Measures, Such as Schedule and Cost

---

Army Inspector General recommended that CMA develop quantifiable metrics and both the Army Inspector General and the Defense Contract Management Agency recommended that CMA place greater weight on cost and schedule control. CMA documents indicate that the schedule performance measure was developed after these recommendations and the Under Secretary's memorandum.

The determination of award fee performance measures and related weight factors is part of CMA's award fee plan template development process, which is used as a guideline by site project managers to develop specific site award fee plans. The template describes specific criteria, standards, and procedures, and provides a range of weight for each performance measure to be used in the award fee plan to assess the systems contractors' performance and to determine the amount of award fee earned. The template allows the site project managers flexibility to select a weighted factor for each performance measure within the CMA template's range based upon the site project manager's discretion. For example, the award fee plan's fiscal year 2007 template had a range of 10 percent to 20 percent for weighting management performance, 20 percent to 30 percent for safety and surety, 20 percent to 25 percent for environmental compliance, 10 percent to 15 percent for cost performance, and 10 percent to 20 percent for schedule performance. The Army adjusted these ranges in fiscal year 2006, adding the schedule performance measure, increasing the template's range for management, and reducing the template's ranges for environmental compliance and safety and surety performance measures.

Table 12 shows historical data on the award fee plans' performance measures and the relative weights selected by each of the incineration sites and Newport as well as the adjustments made from fiscal year 2003 to fiscal year 2007.

**Table 12: Performance Measures and Weights in Award Fee Plans, Fiscal Years 2003-2007**

Percentages					
Performance measures	2003	2004	2005	2006	2007
<b>Management</b>					
Pine Bluff	N/A	15	15	20	20
Umatilla	N/A	15	15	20	20
Anniston	N/A	15	15	20	20
Tooele	15	15	15	20	15
Newport	25	25	15	15	20
<b>Safety and surety</b>					
Pine Bluff	35	40	40	30	30
Umatilla	35	40	40	30	30
Anniston	35	40	40	30	30
Tooele	40	40	40	30	35 <sup>a</sup>
Newport	30	30	35	25	30
<b>Environmental compliance</b>					
Pine Bluff	30	35	35	25	25
Umatilla	30	35	35	25	25
Anniston	30	35	35	25	25
Tooele	35	35	35	25	25
Newport	30	30	35	25	20
<b>Schedule</b>					
Pine Bluff	N/A	N/A	N/A	15	15
Umatilla	N/A	N/A	N/A	15	15
Anniston	N/A	N/A	N/A	10	10
Tooele	N/A	N/A	N/A	15	15
Newport	N/A	N/A	N/A	10	15
<b>Costs</b>					
Pine Bluff	15	10	10	10	10
Umatilla	15	10	10	10	10
Anniston	15	10	10	15	15
Tooele	10	10	10	10	10
Newport	15	15	15	20	15

Percentages					
Performance measures	2003	2004	2005	2006	2007
<b>Technical performance</b>					
Pine Bluff	20	N/A	N/A	N/A	N/A
Umatilla	20	N/A	N/A	N/A	N/A
Anniston	20	N/A	N/A	N/A	N/A
Tooele	N/A	N/A	N/A	N/A	N/A
Newport	N/A	N/A	N/A	N/A	N/A

Source: U.S. Army Sustainment Command.

Notes: Data on the award fee plans included fiscal year 2003 through fiscal year 2007 to represent the period of time the sites were in or preparing for the operations phase. In addition, we evaluated the performance measures and related weights for those fiscal years since the previous APB was established in April 2003. N/A indicates that no weight was assigned to the particular award fee plan performance measure at that site for that particular fiscal year.

<sup>a</sup>Site project managers can select weights outside of suggested ranges with CMA approval. While the award fee plan's fiscal year 2007 template had a range of 20 percent to 30 percent for weighting safety and surety, Tooele's weight for safety and surety for fiscal year 2007 was 35 percent.

As shown in table 12, government site project managers have weighted safety and surety and environmental compliance from a weight factor that ranged from 30 percent to 40 percent in fiscal year 2003 to a weight factor from 20 percent to 35 percent in fiscal year 2007. Also, the award fee plans for the incineration sites and Newport have safety "killer clause" provisions, whereby a systems contractor could lose all or part of its award fee if there is an agent release, an individual or worker is exposed to chemical agent, or there is a release of agent outside of the engineering controls.

In fiscal year 2006, CMA added the schedule performance measure, increased the template's range for management, and reduced the template's range for environmental compliance and safety and surety. We found, based on our analysis, that the site project managers consistently placed schedule and cost performance at lower relative weights than other factors, including management performance. For example, in fiscal years 2006 and 2007, the maximum weight allowable by CMA for schedule performance was 20 percent, but the average weight assigned by the site project managers in the award fee plans was only 13.75 percent for the incineration sites. Conversely, the site project managers weighted other performance measures, such as management, on average much closer to CMA's maximum suggested weights.

Program officials stated that the weights assigned to the different performance measures are based on the relative significance of the criteria

---

to the program. Due to the lethal nature of the material that must be processed, Congress has mandated that the program ensure maximum protection to the workforce, the public, and the environment. Accordingly, as program officials point out, safety/surety carry the highest weighting followed closely by environmental compliance. However, given the maturity of the operations phase, there may be opportunities, from a management perspective, for the Army to further adjust weights for performance measures in the award fee plan template to further incentivize key acquisition outcomes, such as schedule and cost, at the incineration sites. The five incineration sites have been preparing for or were in operation since at least 2003 and, along with Newport and Aberdeen, have eliminated over 45 percent of the chemical munitions stockpile. In addition, the Army has stated that it has reduced much of its safety risk by destroying the bulk of its most lethal and volatile chemical munitions. For example, the Tooele site has mostly ton containers with mustard agent left to destroy, which is considered less risky than other agents. Moreover, Army officials have pointed out that the systems contractors have implemented safety improvement plans that have incorporated appropriate protocols and standards into their daily operations. As a result, from a management perspective, there may be opportunities to further emphasize schedule and cost without sacrificing safety and environmental compliance.

---

### It Is Possible to Make Greater Use of Objective Award Fee Criteria and Evaluation Factors

Based on our review of the fiscal year 2007 award fee plan's performance measures and related evaluation criteria for the sites, most of the award fee criteria and evaluation factors are not objective and measurable. We determined that it is possible to make CMA's award fee plans more effective in achieving certain acquisition outcomes through greater use of objective award fee criteria. We previously recommended that DOD instruct the military services to move toward more outcome-based award fee criteria that are achievable and promote accountability for and are directly linked to achieving desired program outcomes.<sup>62</sup> In March 2006, DOD issued award fee guidance stating that it is imperative that award fees be tied to identifiable interim outcomes, discrete events, or

---

<sup>62</sup>GAO-06-66 and GAO, *NASA Procurement: Use of Award Fees for Achieving Program Outcomes Should Be Improved*, GAO-07-58 (Washington, D.C.: Jan. 17, 2007).

---

milestones as much as possible.<sup>63</sup> We acknowledge that award fee contracts are expected to use subjective criteria to the extent that objective criteria are not feasible. However, we identified additional opportunities, from a management perspective, for CMA to make greater use of objective award fee criteria and evaluation factors to incentivize contractors to achieve desired acquisition outcomes, such as safely destroying the chemical stockpile on schedule and within cost.

The award fee plans for this program make use of both subjective and objective criteria and our analysis of the fiscal year 2007 award fee plan showed that in most cases, the criteria are subjective. Three performance measures—safety, environmental compliance, and schedule—use a mix of objective and subjective performance evaluation criteria, although we noted these evaluations can also factor in subjective assessments. The award fee plan states that in evaluating performance in these areas, a number of subjective attributes will be considered, but there are no specific weights associated with the attributes. Rather, they are considered guides to evaluate the broad spectrum of potential systems contractor performance. The schedule performance measure was, for the most part, objective and linked to an outcome—the destruction of chemical munitions. For example, the 2007 schedule performance category used site-specific destruction tonnage goals related to meeting CWC deadlines and the APB schedule. On the other hand, three other performance measures—cost, management, and surety—are evaluated using all subjective criteria. While we recognize that using subjective criteria to assess systems contractor performance is acceptable, we identified opportunities for the Army to use more objective award fee criteria when evaluating contractor performance.

---

<sup>63</sup>Memorandum from the Under Secretary of Defense for Acquisition, Technology, and Logistics on Award Fee Contracts (FAR 16, DFARS 215, DFARS 216) (Washington, D.C.: Mar. 29, 2006). In addition, the National Defense Authorization Act for Fiscal Year 2007 directed DOD to issue guidance, with detailed implementation instructions, to ensure that all new contracts using award fees link such fees to acquisition outcomes, which are defined in terms of program cost, schedule, and performance. See Pub. L. No. 109-364, § 814 (2006). Furthermore, in an April 2007 memorandum, DOD issued further award fee guidance stating that it is the policy of the department that for new solicitations issued on or after August 1, 2007, objective criteria be utilized, whenever possible, to measure contract performance. If it is determined that objective criteria do not exist, then the head of the contracting activity must sign a determination and finding that “the work to be performed is such that it is neither feasible nor effective to devise predetermined objective incentive targets applicable to cost, technical performance, or schedule.”



---

We developed some illustrative examples to show how certain elements of CMA's subjective criteria taken from the 2007 award fee template could be revised to objectively measure systems contractor performance. We recognize that there are other examples that could be used to illustrate this point and do not suggest that these examples necessarily be used. To develop these examples, we used as criteria our analysis and prior work.<sup>64</sup> For example, the current award fee plan contains the following subjective criterion for evaluating management performance: "Demonstrated ability to practice proactive management to identify and anticipate problems and implement effective countermeasures prior to adverse impact." Illustrative examples of potential objective criteria that could address these criteria are "Develop and implement an integrated risk management plan by [a specified date]" and "Ensure that [a specified percentage] of the risks identified have a countermeasure available and implemented within [a specified number of days] of the mustard container campaign."

Similarly, the current award fee plan contains the following subjective criterion for evaluating cost performance: "Cost management systems (accounting, scheduling, planning, and budgeting) are all efficiently and effectively integrated, and produce consistent, reliable, and accurate data." An illustrative example of a potential objective criterion that could address at least a portion of these criteria is "Ensure that [a specified percentage] of the cost and schedule management systems data accurately depicts contract cost status within the assessment period." Moreover, the current award fee plan contains the following subjective criterion for evaluating surety performance: "Appropriate treatment and disposal of chemical agents and chemical agent standards." An illustrative example of a potential objective criterion that could address at least a portion of these criteria is "Ensure that [a specified percentage] of chemical agents are appropriately treated and disposed of under the chemical agent standards."

After the March 2006 guidance on award fees was issued by the Under Secretary of Defense for Acquisition, Technology, and Logistics, CMA issued a policy on award fees in September 2006. CMA's policy stated that "due to the complexity of the program and the toxic nature of the material being processed, essential elements of performance cannot effectively or feasibly be measured by predetermined objective metrics. Therefore, award fee criteria are established that allow assessment of performance

---

<sup>64</sup>See [GAO-06-66](#) and [GAO-07-58](#).

---

through the use of objective and/or subjective metrics.” Our review of this policy indicated that CMA did not clearly or fully incorporate the concept of tying “award fees to identifiable interim outcomes, discrete events or milestones as much as possible” as called for in the March 2006 guidance. Although not legally required, we believe that tying award fees as much as possible to more objective, measurable evaluation criteria is a sound business and management practice, and that CMA could do more to fully incorporate and implement the March 2006 DOD policy guidance.

---

**Recently Established and Planned Performance-Based Incentive Fees Are Focused on Schedule, but Their Effectiveness Is Uncertain at This Time**

The Army has recently offered monetary fees intended to provide additional incentives to improve schedule performance. In 2005, the Army added to its fee structure the DPPBI, which is an annual performance-based incentive fee that is structured to encourage the systems contractors at the four incineration sites to work collaboratively to improve various aspects of their performance. That is, while each individual site is evaluated and scored separately, the individual scores are averaged to determine a composite score that results in all sites earning the same percentage of the available DPPBI fee pool. Since the initial evaluation period in 2005, the fee amount available for the DPPBI has been 2 percent of the estimated fee-bearing contract costs—relatively small when compared to the award fee available to the incineration sites. The 2 percent DPPBI is in addition to the 10 percent available through base and award fees.

The evaluation factors for assessing systems contractor performance for the DPPBI have changed over time and are divided between objective criteria and a subjective assessment of systems contractor performance during the fiscal year. Three criteria were established for the initial DPPBI evaluation period of January 1 through September 30, 2005: risk mitigation, production assessment, and lessons learned. In the initial evaluation period, the contractors collectively were deemed to have earned 51 percent of the 2005 DPPBI pool or \$3,313,954 out of \$6,497,949. In fiscal year 2006, the DPPBI criteria were changed to put more emphasis on performance outputs and less on processes and procedures. The fiscal year 2006 DPPBI criteria were established to encourage the contractors to collectively reduce project schedules while maintaining a high standard of surety, safety, and environmental compliance. The criteria also were established to increase CMA’s confidence levels that the sites could achieve CWC destruction deadlines, although discrete goals were not specified. For the fiscal year 2006 period of performance, the contractors earned about 93 percent or \$8,771,200 out of the \$9,411,159 in the DPPBI pool for that period.

---

Prior to fiscal year 2007, the DPPBI was not linked to objective schedule performance criteria linked to the April 29, 2012, CWC treaty deadline. Beginning in fiscal year 2007, the DPPBI fee evaluation was linked to achieving discrete schedule milestones associated with achieving the CWC April 29, 2012, deadline. For fiscal year 2007, 70 percent of the total DPPBI fee available to be earned (or up to a maximum of 1.4 percent of the total negotiated contract costs, depending on average collective performance) was based on specified schedule attainment targets for each site. The remaining 30 percent of the available DPPBI fee for fiscal year 2007 is based on subjective criteria related to the contractors' performance in the application of lessons learned, risk management, programmatic procurement, and other collaborative approaches to reduce costs and accelerate destruction of the stockpile. This fee would be in addition to the portion of the award fee targeted at schedule performance, now about 1 percent of total negotiated contract costs at most incineration sites. This additional emphasis on schedule is a positive development, but it remains unclear to us how effective this incentive fee will be in motivating individual systems contractors' schedule performance due to the collective manner in which the fee is earned, its relative size, and recent focus on objective schedule performance. It is particularly unclear to us how individual contractors might be motivated during periods when the underperformance of one or more systems contractors could greatly reduce the potential to earn the fees by the others.

Finally, the Army plans to use a recently authorized incentive fee of up to \$165 million per site in an effort to further motivate the systems contractors to accelerate destruction and closure activities. Although it had not been placed on contract at the time of our review, CMA drafted a plan to offer incentive fees under the authority contained in section 923 of the National Defense Authorization Act for Fiscal Year 2007.<sup>65,66</sup> This plan would allow systems contractors at the four incineration sites the opportunity to earn fees in addition to the 12 percent available to be earned annually. As currently planned, systems contractors will be able to earn incentive payments for completion of destruction operations tied to dates around the final CWC deadline and for the acceleration of facility closure activities, but the effectiveness of this approach is uncertain.

---

<sup>65</sup>Pub. L. No. 109-364 (2006).

<sup>66</sup>Chemical Materials Agency, *Incentive Agreement for Completion of Destruction Operations and Facility Closure Activities at Chemical Stockpile Disposal Facilities* (Washington, D.C.: May 19, 2007).

---

Under CMA's plan, it would offer the additional incentive fee of up to \$150 million to each site—up to \$100 million for destruction operations and up to \$50 million for facility closure activities completed within specified target ranges. Bonuses totaling \$15 million would also be available to each site if all sites complete destruction operations before the treaty deadline and accelerate facility closure activities.

CMA's plan, which would have to be implemented under each of the contracts, has a number of positive features. For example, the plan recognizes, as does the statute, that the enterprise of striving to capture these incentives is to be conducted consistent with the existing obligation to provide for maximum protection for the environment, the general public, and the personnel who are involved in the destruction of the chemical agents and munitions. The potential effectiveness of this particular planned incentive at motivating the systems contractors to complete destruction operations around the treaty deadline is also uncertain. This incentive arrangement has not yet been placed on contract and thus it is too early to assess its potential success. Additional details about the two recently established incentive fees are in appendix II.

---

## Conclusions

Destroying the nation's remaining stockpile of chemical weapons in a safe, efficient, and timely manner is essential to improve the potential for the United States to meet CWC obligations and to reduce the risk to the public and the environment of a potential catastrophic event associated with lethal chemical stockpiles. We recognize that maintaining high levels of safety and environmental compliance are inextricably linked to success in meeting schedule and cost goals. We also recognize that it is highly important that program management, schedule and cost estimates, and monetary incentives be soundly structured, well aligned with program goals and desired acquisition outcomes, reasonable, and reliable. While DOD has taken specific actions to strengthen program management, improving the focus of annual performance plans beyond a single year and refining and finalizing planned actions in the risk management area could greatly enhance the usefulness of these management tools for DOD, CMA, the sites, and Congress. In addition, without a fully developed and implemented risk management approach, CMA cannot ensure that it is fully anticipating and mitigating risks going forward. Without such improvements, it would be difficult for program officials to accurately track progress, effectively initiate timely actions to mitigate risks, and increase the potential for program activities to further contribute to the overall program goal of safely destroying the chemical weapons stockpile in a safe and environmentally compliant manner.

---

Similarly, it is important that DOD, CMA, and Congress have reasonable schedule and cost estimates with reliable supporting data and other assumptions, including when they change significantly, either increasing or decreasing funding requirements. With most of the chemical agent destruction sites significantly ahead of the 2005 program office schedule, the program milestones appear to be overly conservative, regardless of unexpected risks, such as the rocket fires at Umatilla. As a result, the program schedule milestones may no longer be a realistic baseline for measuring program performance and warrant further review and independent assessment to give DOD and Congress greater confidence that the program is being held accountable to a reasonable baseline to measure the program's progress. In addition, the Chemical Demilitarization Program's revised APBs and its most recent SARs—key management and oversight documents—lack up-to-date and reviewed schedule milestone information. Furthermore, DOD needs accurate and realistic closure cost estimates and other cost inputs for each of DOD's chemical demilitarization sites to accurately and adequately budget for the program, make the EVM systems useful for program oversight, and arrive at reliable cost estimates.

Finally, from a management perspective, CMA could improve its use of award fees to incentivize the systems contractors to try to meet the CWC treaty deadline in a safe and environmentally compliant manner, particularly at the incineration sites where award fees are predominant. We identified opportunities for CMA to continue and further advance its recent efforts to emphasize schedule and cost and to incorporate more objective measures in its award fee evaluation criteria as called for in DOD guidance on award fees. Given the maturity of the operations phase, the experience gained by the systems contractors, and the composition of the remaining stockpile, CMA may be able to adjust the award fee plan to provide better interim incentives to accelerate the systems contractors' performance, and do so in a safe and environmentally sound manner. Doing so would also have the benefit of reducing the security vulnerabilities and other risks of storing lethal chemical agents any longer than necessary, which creates additional safety and environmental hazards. We recognize that to the extent that objective criteria are not feasible, using subjective criteria to determine award fees is reasonable and expected, and DOD guidance directs that award fee criteria be tied to performance measures, such as identifiable interim outcomes, discrete events, or milestones, as much as possible. We identified opportunities for CMA to improve the effectiveness of its monetary incentives by better aligning its award fee policy and evaluation criteria to DOD's March 2006 guidance.

---

## Recommendations for Executive Action

We are making 13 recommendations for executive action. They are as follows.

To strengthen program management and increase the likelihood that more progress can be made in destroying chemical agents, we recommend that the Secretary of Defense direct the Secretary of the Army to take the following three actions:

- incorporate baseline and trend data for past performance and multiyear performance goals for the future in its annual performance plan;
- develop interim destruction goals, approaches, and milestones that are directly linked to overall program goals for meeting CWC deadlines; and
- establish a time frame for completing and implementing its risk management approach, including integration across sites and with DOD.

To provide more realistic cost estimates for chemical demilitarization sites in light of recent experience and information gained, we recommend that the Secretary of Defense direct the Secretary of the Army to update the 2005 program schedule milestones for each of DOD's chemical demilitarization sites to reflect recent site processing rates and then adjust the cost estimate accordingly.

To help ensure that the program baseline schedule is current and achievable and to improve the accuracy and reliability of program manager estimates for measuring the Chemical Demilitarization Program's progress, we recommend that the Secretary of Defense direct the CAIG to establish a periodic schedule to review the program's processing history to determine whether the schedule milestones are still reasonable.

To increase the ability of decision makers to measure the Army's and CMA's performance against schedule growth, we recommend that Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology, and Logistics to include in the Chemical Demilitarization Program's APB and SAR the updated and reviewed schedule milestones for completing destruction operations and facility closure activities for each of the chemical agent destruction sites.

To provide more realistic cost estimates for closure of chemical demilitarization sites and to establish, stabilize, and maintain an accurate, valid, and current performance management baseline, we recommend that

---

the Secretary of Defense direct the Secretary of the Army to take the following three actions:

- coordinate with the systems contractors in defining closure requirements and developing accurate and realistic closure cost estimates for each of DOD's chemical demilitarization sites' contract performance measurement baseline;
- define all contract requirements, including authorized unpriced work associated with facility closure activities, and develop comprehensive cost estimates through closure at each chemical destruction site; and
- establish a time frame for completing the negotiation for placing all authorized work that has not been priced on contract and ensuring that the negotiations take place.

After the cost estimates are complete and schedule milestones have been updated and reviewed, we recommend that the Secretary of Defense direct the CAIG to conduct an independent cost review of the cost estimates.

To continue to further the Army's efforts to improve the potential to meet the CWC deadline for destroying chemical weapons safely and within environmental compliance and reduce the risk of storing lethal chemical agents any longer than necessary, we recommend that the Secretary of the Defense direct the Secretary of the Army to determine for each of the four incineration site contracts whether greater weight can be applied to performance measures, such as schedule and cost, in award fee plans to further incentivize the systems contractors to increase the destruction rate of chemical agents in a safe and environmentally sound manner.

To further link monetary incentives and key acquisition outcomes, and to provide a means for objectively measuring the systems contractors' performance during the assessment period as much as possible, we recommend that the Secretary of Defense direct the Secretary of the Army to take the following two actions:

- better align its award fee policy with DOD's March 2006 guidance on award fees and
- link more of its award fee criteria to performance measures that focus on identifiable interim outcomes, discrete events, or milestones.

---

## Agency Comments and Our Evaluation

In written comments on a draft of this report, DOD concurred or partially concurred with 12 of our 13 recommendations. DOD did not concur with our recommendation regarding defining closure requirements and developing accurate and realistic closure cost estimates for each of DOD's chemical demilitarization sites. DOD recommended that we delete it, since DOD officials believe that a subsequent recommendation defining all contract requirements, including those associated with facility closure activities, was more encompassing. Based on DOD's comments, rather than deleting the recommendation, we clarified it and the related recommendation to more clearly distinguish the difference between the two recommendations, and consolidated it with our two other recommendations related to defining contract requirements. DOD also stated that the department will continue to use acquisition management tools and discipline to ensure the destruction of the United States' chemical weapons stockpile in a safe and secure manner, while being economical and meeting the U.S. commitments under the Chemical Weapons Convention. DOD identified a number of actions that it already has initiated in response to our recommendations. DOD also provided us with technical comments, which we incorporated in the report, as appropriate. DOD's comments are reprinted in appendix III.

Regarding our four recommendations related to strategic planning tools, DOD concurred with our recommendation that it incorporate baseline and trend data for past performance and multiyear performance goals for the future in its annual performance plan. DOD stated that CMA currently is incorporating these items into its fiscal year 2008 Annual Performance Plan and expects this effort to be completed by December 31, 2007. DOD partially concurred with our recommendation that it provide direction to develop interim destruction goals, approaches, and milestones that are directly linked to overall program goals for meeting CWC deadlines. In the spirit of our recommendation, DOD stated that it would ensure that all future CMA performance plans incorporate annual goals and approaches leading toward the April 29, 2012, destruction deadline through direction issued annually in support of its existing strategic governance process and that additional direction would not be needed. We support this planned action, which, if implemented properly, would accomplish the same effect as our recommendation. DOD concurred with our recommendation that the Army establish a time frame for completing and implementing its risk management approach, including integration across sites and with DOD. DOD stated that it expects an approved risk management approach to be completed by June 30, 2008. DOD concurred with our recommendation to include in the Chemical Demilitarization Program's APB and SAR the updated and reviewed schedule milestones for completing destruction



---

operations and facility closure activities for each of the chemical agent destruction sites. DOD stated that it would request administrative changes to remove placeholder terminology from these documents and replace them with the CAIG's schedule estimates.

Regarding our two recommendations related to schedule and cost estimates, DOD partially concurred with our recommendation that it update the 2005 program schedule milestones for each of DOD's chemical demilitarization sites to reflect recent site processing rates and then adjust the cost estimate accordingly. DOD stated that it has gained only limited information during the past year regarding processing rates, unknown risks, and the potential for a chemical event, and thus does not believe it would be prudent to adjust cost and schedule estimates or rebaseline at this time. However, DOD will evaluate the cost and schedule estimates for the entire program during the upcoming Fiscal Year 2010-2015 Program Objectives Memorandum build process and program review, and will determine whether an update is warranted. DOD concurred with our recommendation to establish a periodic schedule for the CAIG to review the program's processing history to determine whether the schedule milestones are still reasonable. DOD stated that it conducts a biannual program review of the Chemical Demilitarization Program and that during the next review in the spring of 2008, it would evaluate the program's cost and schedule estimates. If significant differences exist between the program's baseline and the revised estimates, then DOD would request a CAIG review that could result in new cost and schedule estimates. However, we believe that our report provides clear and sufficient evidence demonstrating that there are differences between the program's current schedule and cost estimates and DOD's baseline to warrant a CAIG review and update as we recommended.

Regarding our four recommendations related to contract requirements, based on DOD's comments, we consolidated and clarified two of our recommendations. DOD suggested that we delete the recommendation that CMA coordinate with the systems contractors in defining closure requirements and in developing accurate and realistic closure cost estimates for each of DOD's chemical demilitarization sites, since the subsequent recommendation is more encompassing. Instead, we clarified this recommendation by adding "for each of DOD's chemical demilitarization sites' *contract performance measurement baseline*" [emphasis added], and consolidated it with our two other recommendations related to defining contract requirements discussed below. As discussed in our report, we continue to believe that CMA and the systems contractors must coordinate their efforts to develop accurate

---

and realistic closure cost estimates. In addition, we consolidated our recommendation that after the cost estimates are complete and schedule milestones have been updated and reviewed, the CAIG conduct an independent cost review of the cost estimates with our two recommendations that are discussed below. DOD partially concurred with our recommendation to define all contract requirements, including those associated with facility closure activities, and develop comprehensive cost estimates through closure at each chemical destruction site. Based on DOD's comments, we clarified this recommendation by adding "define all contract requirements, including *authorized unpriced work* associated with facility closure activities" [emphasis added]. DOD stated that since June 2007, three of the five CMA destruction sites have completed contract performance baselines that include contract requirements for operations, secondary waste processing, closure, and known risk. Negotiations are under way to complete the contract performance baseline for the Tooele, Utah, site and the contract requirements and cost estimates for the Newport, Indiana, site by June 30, 2008. DOD concurred with our recommendation to establish a time frame for completing the negotiation for placing all authorized work that has not been priced on contract and ensuring that the negotiations take place. DOD stated that it expects negotiations to be completed by June 30, 2008. Finally, DOD partially concurred with our recommendation that the CAIG conduct an independent review of the program's cost estimates stating that the program's biannual review in support of the budget submission will determine if a CAIG independent assessment is warranted. We continue to believe that providing an independent review of the program's cost estimates could provide greater assurance that cost estimates are reasonable.

With regard to our three recommendations related to incentive fees, DOD concurred with our recommendation to determine for each of the four incineration site contracts whether greater weight can be applied to performance measures, such as schedule and cost, in award fee plans to further incentivize the systems contractors to increase the destruction rate of chemical agents in a safe and environmentally sound manner. DOD also concurred with our recommendation to better align CMA's award fee policy with DOD's March 2006 guidance on award fees, stating that this action had been completed on September 7, 2007. However, when a copy of the revised policy was requested, DOD stated that its response incorrectly referenced that this action has been completed. As such, DOD will direct a revision of the CMA policy that aligns it with the DOD guidance on award fees, and the action is to be completed by March 31, 2008. DOD partially concurred with our recommendation to link more of

---

its award fee criteria to performance measures that focus on identifiable interim outcomes, discrete events, or milestones. DOD stated that it would conduct a review of CMA award fee plans, to be completed by March 31, 2008, and would then determine whether further direction and action is required. While this review represents a positive step, our report shows that there are several areas in which DOD could better link more of its award fee criteria with performance measures that focus on identifiable outcomes and we believe that DOD should fully implement this recommendation.

---

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 30 days from the date of this letter. We will then send copies of this report to the Chairmen and Ranking Members of the Senate Committee on Armed Services; Senate Committee on Homeland Defense and Governmental Affairs; Subcommittee on Defense, Senate Committee on Appropriations; House Committee on Oversight and Government Reform; and Subcommittee on Defense, House Committee on Appropriations, and other interested congressional parties. We are also sending copies of this report to the Secretary of Defense; the Secretary of the Army; the Director, Office of Management and Budget; and the Director, U.S. Army Chemical Materials Agency. We also will make copies available to others on request. In addition, this report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions concerning this report, please contact me at (202) 512-5431 or [dagostinod@gao.gov](mailto:dagostinod@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.

A handwritten signature in black ink, reading "Davi M. D'Agostino". The signature is stylized with large, flowing loops and a cursive script.

Davi M. D'Agostino  
Director, Defense Capabilities  
and Management

---

# Appendix I: Scope and Methodology

---

To assess the progress the Department of Defense (DOD) and the Army have made in implementing our prior recommendations to strengthen program management, whether it has been sufficient, and whether actions taken to identify and mitigate the risk of future program schedule extensions and cost growth have been effective, we obtained and reviewed strategic and implementation plans and interviewed cognizant officials to identify whether key elements were present, such as a program mission statement, long-term goals and objectives, delineation of roles and responsibilities of DOD and Army offices, and near-term performance measures.

To assess the reasonableness of the methodology used to determine schedule milestones as well as the reliability of cost estimates, we reviewed current program estimates, destruction schedules, earned value management (EVM) data, and other documents. We also obtained and reviewed the program's risk management plans and related documents. In addition, we also identified the issues that had caused delays and ascertained approaches being used to reduce the potential for delays in the future.

The Army's Chemical Materials Agency (CMA) provided us with EVM reports submitted to the Army by the systems contractors for each of the chemical demilitarization facilities spanning the period from December 2000 through February 2007. EVM reports were provided electronically in the form of Deltek wInsight™ transfer files for Cost Performance Report Formats 1 through 4 and separate Adobe®, MS Word, or MS Excel files for Format 5.

Our approach in assessing the adequacy of the systems contractors' EVM reporting was to analyze the data provided according to EVM analysis tasks and DOD earned value implementation guidance. The GAO EVM analysis tasks are a set of 10 analysis tasks developed by GAO that are used to assess the adequacy of EVM. These 10 analysis tasks were performed on each of the EVM reports provided to us. Guidance and procedures outlined within the *DOD Earned Value Management Implementation Guide* were also referenced to assess EVM system and reporting adequacy.

Our approach in assessing the Army's ability to assess, synthesize, and incorporate systems contractor historical and estimated cost, technical, and schedule performance into the current program estimate was to align historical contract performance data as documented within the EVM reports with program estimate and baseline data documented within

---

Selected Acquisition Reports, the President's budget, and the Fiscal Year 2005 Army Cost Position.

In performing this assessment, we also conducted interviews with government and systems contractor officials at CMA headquarters in Aberdeen, Maryland; Tooele Chemical Agent Disposal Facility, Deseret Chemical Depot (Tooele), Utah; and Umatilla Chemical Agent Disposal Facility, Umatilla Chemical Depot (Umatilla), Oregon.

To analyze the effectiveness of DOD's and the Army's use of monetary incentives to improve systems contractors' performance, we obtained and reviewed contract documentation related to the implementation of the contracts' incentives, including the basic contract and modifications, award fee plans, award fee determining official decisions, award fee evaluation board reports, and pre- and postnegotiation memorandums, and the performance-based incentive fees, including the Director's Programmatic Performance Based Incentive (DPPBI) fee. We also interviewed DOD and Army officials to determine the types of award and incentive fees offered at the incineration sites and at Newport Chemical Agent Disposal Facility, Newport Chemical Depot (Newport), Indiana.

To evaluate the effectiveness of the award fees in controlling costs and schedule, we reviewed the award fee plans from fiscal year 2003 to fiscal year 2007 to identify the types of performance measures and weight factors used to incentivize the systems contractors to safely destroy the chemical weapons stockpile. We also looked at the extent the criteria used for the performance measures were linked to measurable outcomes. To identify the percentage of award fees paid to the systems contractors at the incineration sites and Newport, we collected and reviewed data on the award fee payments, including the amount available for the contractors to earn, the amounts earned from fiscal year 2003 through fiscal year 2006, and the guidance for improving the use of these fees. We used data on the award fee plans from fiscal year 2003 through fiscal year 2007 because they represented the period of time the sites were in the operations phase.

To evaluate the extent documentation was prepared for adjustments to the award fee plans, we reviewed CMA's Integrated Process Team documents from fiscal year 2003 to fiscal year 2007 to identify adjustments made by the various stakeholders, such as the CMA Director, U.S. Army Sustainment Command, CMA Program and Policy Office, incinerator site project managers, and systems contractor site general managers. We evaluated whether Army officials provided complete documentation supporting their rationale for adjusting performance measures and related

---

weights throughout the process. We also evaluated whether CMA prepared adequate supporting documentation to enable reviewers to understand and evaluate the process that was used, and whether it contained, among other things, an adequate discussion of alternative performance measures or the combination of award and incentive fees that it considered, tested, and rejected and the reasons for rejecting them.

To evaluate the effectiveness of the authority contained in section 923 of the National Defense Authorization Act for Fiscal Year 2007, we obtained and reviewed the incentive agreement plan and incentive fees for the Aberdeen Chemical Agent Disposal Facility (Aberdeen), Maryland, and Newport to determine the challenges those sites faced in negotiating the incentive fee agreements. Also, we interviewed officials with the U.S. Army Sustainment Command, CMA, and CMA and systems contractors at Tooele and Umatilla.

We also met with DOD and Army program officials and interviewed officials at two of the chemical agent destruction sites. Finally, this report focuses primarily on the seven CMA-managed chemical destruction sites—Aberdeen; Anniston Chemical Agent Disposal Facility, Anniston Chemical Activity, Alabama; Johnston Atoll in the Pacific Ocean; Newport; Pine Bluff Chemical Agent Disposal Facility, Pine Bluff Chemical Activity, Arkansas; Tooele; and Umatilla—because most are in the operational phase and represent about 82 percent of the remaining stockpile of chemical agents to be destroyed, and have reached a level of maturity in processing a variety of types of munitions and agents that will help meet Chemical Weapons Convention (CWC) goals. This report does not focus on two sites—Aberdeen and Johnston Atoll—that have already completed operations and have either been closed or are being closed. It also does not focus on the two chemical agent destruction sites that are part of the Assembled Chemical Weapons Alternatives program—Blue Grass Chemical Agent-Destruction Pilot Plant, Blue Grass Chemical Activity (Blue Grass), Kentucky, and Pueblo Chemical Agent-Destruction Pilot Plant, Pueblo Chemical Depot, Colorado—that currently are in the design and construction phase to destroy chemical agents, report directly to DOD rather than to the Army, and are not expected to help meet CWC goals.

We examined the reliability of the data used in this report by verifying EVM system certification, applying analytical tests to the EVM data, and examining EVM system effectiveness in providing meaningful performance measurement to program management. We found that EVM systems at each site had been certified. The results of our analytical tests found the data to be reasonably free of data errors and anomalies. However, when

---

we examined the effectiveness of the EVM system to provide meaningful performance measurement, we found insufficient reliability to address our objectives.

We conducted this performance audit from May 2006 through July 2007 in accordance with generally accepted government auditing standards.

---

# Appendix II: Two Recently Introduced Performance-Based Incentive Fees

---

The Army's performance-based incentive fee to collaboratively improve schedule and cost performance was established in 2005 because the use of award fees had not been successful. Also, the Army plans to use a recently authorized \$165 million incentive fee to accelerate destruction and closure activities to dates linked with the treaty schedule.

---

## Army's Performance-Based Incentive Fee Begun in 2005 Was Recently Targeted to Objective Performance

In 2005, CMA established the DPPBI fee to improve schedule and cost performance because CMA's use of award fees had not been successful in controlling cost and schedule at the incineration sites. This incentive fee is 2 percent of the total 12 percent available fees, which includes the 3 percent base fee that is not performance related. DPPBI was structured so that the collective performance of the systems contractors is evaluated and rewarded through improved collaboration among the systems contractors that operate the four incineration sites. That is, while each individual site is evaluated and scored separately, the individual scores are averaged to determine a composite score that results in all sites earning the same percentage of the available DPPBI fee pool.

The evaluation factors for assessing the systems contractor performance for DPPBI have changed over time and are divided between objective criteria and a subjective assessment of systems contractor performance during the fiscal year. Three criteria were established for the initial DPPBI evaluation period of January 1 through September 30, 2005: risk mitigation, production assessment, and lessons learned. In the initial evaluation period, the contractors collectively were deemed to have earned 51 percent of the 2005 DPPBI pool or \$3,313,954 out of \$6,497,949. In fiscal year 2006, the DPPBI criteria were changed to put more emphasis on performance outputs and less on processes and procedures. The fiscal year 2006 DPPBI criteria were established to encourage the contractors to reduce project schedules while maintaining a high standard of surety, safety, and environmental compliance. The criteria also were established to increase CMA's confidence levels that the sites could achieve CWC destruction deadlines, although discrete goals were not specified. For the fiscal year 2006 period of performance, the contractors earned about 93 percent or \$8,771,200 out of the \$9,411,159 in the DPPBI pool for that period.

Until fiscal year 2007, the DPPBI fee evaluation was not linked to objective schedule performance criteria linked to the April 29, 2012, CWC extended treaty deadline. In fiscal year 2007, schedule performance attainment was added to the DPPBI objective criteria amounting to 70 percent of the total available DPPBI fee (or up to 1.4 percent for average collective



performance) and amounting to 30 percent for subjective criteria related to the contractors' performance in the application of lessons learned, risk management, programmatic procurement, and other collaborative approaches to reduce cost and accelerate destruction of the U.S. stockpile. The amount of the fee that can be earned by the systems contractors depends not just on a systems contractor's individual performance, but also on the performance of the other systems contractors. For example, if the systems contractor at Anniston is performing well in meeting its schedule-related goals during a specific period, but the systems contractor at Tooele is not, then the Anniston systems contractor would be encouraged to offer assistance to the Tooele systems contractor. If the Tooele systems contractor's schedule performance could not be improved, then the Anniston systems contractor's potential to earn this fee would be reduced as would the potential of systems contractors at the other sites.

---

Recently Authorized  
Incentives Are Targeted to  
Completing Destruction  
Operations around the  
Treaty Deadline and  
Accelerating Facility  
Closure Activities

CMA plans to offer incentive fees under the authority contained in section 923 of the National Defense Authorization Act for Fiscal Year 2007,<sup>1</sup> permitting systems contractors the opportunity to earn incentive payments for the completion of destruction operations by or near the CWC deadline and the acceleration of facility closure activities, but the effectiveness of this approach is uncertain. The purpose of section 923 is to provide the systems contractor for a chemical demilitarization facility an incentive to accelerate the safe elimination of the U.S. chemical weapons stockpile and to reduce the total cost of the Chemical Demilitarization Program by providing incentive payments for the early completion of destruction operations and the closure of such a facility.<sup>2</sup> Section 923 authorizes the inclusion of incentives clauses in chemical demilitarization contracts for the completion of both destruction operations and facility closure activities within target incentive ranges. Target incentive ranges are to be jointly agreed upon by the contracting officer and the systems contractor concerned and are to be specified in the contract's incentives clause. Under the statute, the amount of incentive payment a systems contractor may earn through such incentive clauses will be based on how early within the specified target incentive range the systems contractor completes destruction operations and facility closure activities. Section 923 sets limitations on the amount of incentive payments a systems contractor may receive through the incentives clauses. It establishes \$110 million as the

---

<sup>1</sup>Pub. L. No. 109-364 (2006).

<sup>2</sup>Pub. L. No. 109-364, § 923 (a)(2) (2006).

maximum incentive payment for the completion of destruction operations within the target incentive range specified under the contract's incentives clause and \$55 million for the completion of facility closure activities within the target incentive range specified under the contract's incentives clause.<sup>3</sup>

Although it had not been implemented at the time of our review, CMA had drafted a plan for implementation of the incentives authorized under section 923.<sup>4</sup> The plan articulates that the systems contractors are to assume responsibility for identifying and mitigating all site-specific and programmatic risks in order to successfully complete program objectives within budgeted cost and schedule targets. The plan further relates that in return, the systems contractors will receive incentives measured against established schedule targets for operations completion and facility closure.

Under CMA's plan, it would offer the additional incentive fee of up to \$150 million to each site—\$100 million for destruction operations completed within target ranges by or near the April 29, 2012, treaty deadline, and \$50 million for facility closure activities brought successfully to completion within target ranges. CMA's plan establishes the period from November 1, 2011, through October 31, 2013, as the target incentive range for the completion of operations at all sites, with the maximum amount available to be earned, exclusive of the bonus, at \$100 million. Ninety-five percent of the incentive can be earned for completing operations by the CWC extended deadline of April 29, 2012. After the CWC deadline, a percentage of the incentives can be earned through October 31, 2013, on a reduced sliding scale. The CMA plan also offers up to \$50 million per site for the completion of facility closure activities within a specified range of dates unique to each site. One hundred percent of the \$50 million would be earned by a systems contractor for completion of facility closure activities on the first date of the specified range. The systems contractor would earn some lesser percentage of the \$50 million for completion on any date between the first and last dates of the specified range.

---

<sup>3</sup>Pub. L. No. 109-364, § 923 (b)(2) (2006).

<sup>4</sup>Chemical Materials Agency, *Incentive Agreement for Completion of Destruction Operations and Facility Closure Activities at Chemical Stockpile Disposal Facilities* (Washington, D.C.: May 19, 2007).

Under CMA's plan, systems contractors can earn up to \$165 million at their respective sites through bonus potential. In addition to the potential \$100 million fee for completing operations ahead of the extended CWC deadline and \$50 million for meeting specified closure targets, bonuses can also be earned. A bonus of \$10 million is offered to each site if all the sites complete destruction operations prior to the CWC deadline of April 29, 2012. A bonus of \$5 million is also offered to each site for accelerated completion of facility closure activities.

CMA's plan, which would have to be implemented under each of the contracts, includes language that insulates the government from having to make incentive payments to the systems contractors if they did not strictly perform under the terms CMA has set under the plan. In firmly establishing the target incentive ranges, the plan states that the target dates are not subject to extension except for catastrophic causes beyond the control of and without the fault or negligence of the systems contractor, its subcontractors, and suppliers. The plan establishes that the systems contractors are not entitled to submit claims for loss of opportunity to earn the incentives or to increase incentive pools due to failure of the government to provide resources over and above those specifically identified in the contract. It also stipulates that payments of incentives will be subject to adjustment based upon final audits of operation costs and closure costs. At the same time, the plan recognizes, as does the statute, that the enterprise of striving to capture these incentives is to be conducted consistent with the existing obligation to provide for maximum protection for the environment, the general public, and the personnel who are involved in the destruction of the chemical agents and munitions. The effectiveness of this planned incentive is uncertain because it had not yet been negotiated or placed on contract at the time of our review.

# Appendix III: Comments from the Department of Defense



NUCLEAR AND CHEMICAL  
AND BIOLOGICAL DEFENSE  
PROGRAMS

ASSISTANT TO THE SECRETARY OF DEFENSE  
3050 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3050

NOV 16 2007

Ms. Davi M. D'Agostino  
Director, Defense Capabilities and Management  
United States Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

Dear Ms. D'Agostino:

This is the Department of Defense (DoD) response to the GAO draft report, GAO-08-134, 'CHEMICAL DEMILITARIZATION: Additional Management Actions Needed to Meet Key Performance Goals of DoD's Chemical Demilitarization Program,' dated October 3, 2007 (GAO Code 350799).

The DoD concurs with most of the draft report's recommendations, except those pertaining to when cost and schedule estimates should be revised. The Department will continue to use acquisition management tools and discipline to ensure the destruction of the United States' chemical weapons stockpile in a safe and secure manner, while being economical and meeting our commitments under the Chemical Weapons Convention.

The Department appreciates the opportunity to provide comments on the draft report. These comments, including technical comments, are enclosed. For further questions concerning this report, please contact Barbara Burgess, Senior Program Analyst for the Chemical Demilitarization Program, (703) 588-1983, extension 113.

Sincerely,

A handwritten signature in cursive script, reading "Jean D. Reed", is positioned above the typed name.

Jean D. Reed  
Special Assistant  
Chemical and Biological Defense and  
Chemical Demilitarization Programs

Enclosures:  
As stated

cc:  
Deputy Assistant Secretary of the Army (Elimination of Chemical Weapons)

**GAO DRAFT REPORT – DATED OCTOBER 3, 2007  
GAO CODE 350799/GAO-08-134**

**“CHEMICAL DEMILITARIZATION: Additional Management Actions Needed to Meet  
Key Performance Goals of DoD’s Chemical Demilitarization Program”**

**DEPARTMENT OF DEFENSE COMMENTS  
TO THE RECOMMENDATIONS**

**RECOMMENDATION 1:** The GAO recommends the Secretary of Defense direct the Director of U.S. Army Chemical Materials Agency to incorporate baseline and trend data for past performance and multiyear performance goals for the future in its annual performance plan.

**DoD RESPONSE:** Concur. The Department recognizes that U.S. Army Chemical Materials Agency (CMA) is currently incorporating baseline and trend data for past performance and multiyear performance measures in the CMA Annual Performance Plan for 2008. This effort is expected to be completed and staffed by end of the first quarter of Fiscal Year 2008.

**RECOMMENDATION 2:** The GAO recommends the Secretary of Defense direct the Director of U.S. Army Chemical Materials Agency to develop interim destruction goals, approaches, and milestones that are directly linked to overall program goals for meeting Chemical Weapons Convention deadlines.

**DoD RESPONSE:** Partially Concur. The Department recognizes that the U.S. Army Chemical Materials Agency (CMA) annual destruction goals are interim destruction goals for meeting the Chemical Weapons Convention (CWC) destruction milestones. The Chemical Demilitarization Program Fiscal Year 2007 Annual Performance Plan provided the annual destruction goals for meeting the CWC 45 percent destruction milestone of December 31, 2007. The Department will continue to ensure all future CMA performance plans incorporate annual goals and approaches leading toward the April 2012 destruction deadline through direction issued annually in support of strategic governance. Therefore, no further direction is required from the Secretary of Defense to develop interim goals, approaches, and milestones.

**RECOMMENDATION 3:** The GAO recommends the Secretary of Defense direct the Director of U.S. Army Chemical Materials Agency to establish a time frame for completing its risk management approach, including integration across sites and with DoD.

**DoD RESPONSE:** Concur. The U.S. Army Chemical Materials Agency (CMA) is currently evaluating and updating the CMA risk management approach including integration of risk management across sites and within CMA Headquarters. The Department expects an approved risk management approach to be completed by the third quarter of Fiscal Year 2008.

**RECOMMENDATION 4:** The GAO recommends the Secretary of Defense direct the Director of U.S. Army Chemical Materials Agency to update the 2005 program schedule milestones for each of DoD's chemical demilitarization sites to reflect recent site processing rates and then adjust the cost estimate accordingly.

**DoD RESPONSE:** Partially Concur. The Department recognizes successes within the Chemical Demilitarization Program (CDP) over the past two years. However, there are still some areas of the program, (i.e., destruction of secondary hazardous waste and closure of the chemical weapons destruction facilities), with limited information to adjust cost and schedule estimates. As the GAO stated in their final report: *NSIAD-00-80, Chemical Weapons Disposal: Improvements Needed in Program Accountability and Financial Management, May 2000*: "The Army also needs additional time to develop a reliable baseline to estimate the costs for the closure and remediation of the chemical stockpile disposal facilities....Furthermore, because no stockpile disposal facility has yet to be remediated, the Army lacks real time experience on which to estimate these costs." The CDP now has two sites to compare closure activities, Johnston Atoll Chemical Agent Destruction System (JACADS) and Aberdeen Chemical Agent Disposal Facility (ABCDF). JACADS completed destruction operations in November 2000 and most closure activities in June 2004, with the exception of final closure of the Resource Conservation and Recovery Act permit, which is not expected until November 2008. The ABCDF completed operations in February 2006 and closure activities were completed in March 2007. With this limited information for closure, the U.S. Army Chemical Materials Agency (CMA) has recently completed contract performance baselines that include operations, secondary waste processing, closure and known risk, for sites at Anniston, Alabama; Pine Bluff, Arkansas; and Umatilla, Oregon.

In addition, the Department approved the revised Acquisition Program Baselines for the Chemical Demilitarization Program – U.S. Army Chemical Materials Agency (Chem Demil-CMA) and Chem Demil-CMA Newport Major Defense Acquisition Programs in April 2006, with the cost and schedule estimates based on the Cost Analysis Improvement Group's (CAIG) estimates. The CAIG estimates were certified to Congress in May 2005 as part of the Nunn-McCurdy unit cost breach. The increase in the unit cost was due primarily to more realistic schedule estimates.

Therefore, the Department does not believe it is prudent to adjust cost and schedule estimates or rebaseline at this time due to limited information gained during the past year associated with processing rates, unknown risks, and the potential for a chemical incident. The Department will evaluate the cost and schedule estimates for the entire CDP during the upcoming Fiscal Year 2010-2015 Program Objectives Memorandum build process and program review, and will determine whether an update is warranted.

**RECOMMENDATION 5:** The GAO recommends the Secretary of Defense direct the Chemical Analysis Improvement Group to establish a periodic schedule to review the program's processing history to determine whether the schedule milestones are still reasonable.

**DoD RESPONSE:** Concur. The Department conducts a biannual program review of the Chemical Demilitarization Program in support of the budget estimate submission. During this

review, the program office schedule and cost estimates are reviewed in comparison with the approved Acquisition Program Baselines to determine whether there are any significant differences. If there are significant differences, the Department will request the Cost Analysis Improvement Group conduct an independent assessment and possibly develop cost and schedule estimates. The next review will occur during the Fiscal Year 2010-2015 Program Objectives Memorandum build process and program review in the spring of calendar year 2008.

**RECOMMENDATION 6:** The GAO recommends the Secretary of Defense direct the Under Secretary of Defense for Acquisition, Technology and Logistics to include in the Chemical Demilitarization Program's Acquisition Program Baseline and Selected Acquisition Report the updated and reviewed scheduled milestones for completing destruction operations and facility closure activities for each of the chemical agent destruction sites.

**DoD RESPONSE:** Concur. The Department will request administrative changes to the Chemical Demilitarization Program-U.S. Army Chemical Materials Agency (Chem Demil – CMA) and Chem Demil-CMA Newport Acquisition Program Baselines and upcoming Selected Acquisition Reports to remove the "To Be Determined (TBDs)," which were used as a placeholder for schedule milestones beyond April 2012, and replace with the Cost Analysis Improvement Group's schedule estimates.

**RECOMMENDATION 7:** The GAO recommends the Secretary of Defense direct the Director of the U.S. Army Chemical Materials Agency to coordinate with the systems contractors in defining closure requirements and developing accurate and realistic closure cost estimates for each of DoD's chemical demilitarization sites.

**DoD RESPONSE:** Non-Concur. The Department recommends GAO delete this recommendation since Recommendation #9 is more encompassing.

**RECOMMENDATION 8:** The GAO recommends the Secretary of Defense direct the Cost Analysis Improvement Group to conduct an independent cost review of the cost estimates.

**DoD RESPONSE:** Partially Concur. The Department conducts a biannual program review of the Chemical Demilitarization Program in support of the budget estimate submission. During this review, the program office schedule and cost estimates are reviewed in comparison with the approved Acquisition Program Baselines to determine whether there are any significant differences. If there are significant differences, the Department will request the Cost Analysis Improvement Group conduct an independent assessment and possibly develop cost and schedule estimates. Therefore, no direction to conduct a cost review will be given at this time.

**RECOMMENDATION 9:** The GAO recommends the Secretary of Defense direct the Director of the U.S. Army Chemical Materials Agency to define all contract requirements, including those associated with facility closure activities, and develop comprehensive cost estimates through closure at each chemical destruction site.

**DoD RESPONSE:** Partially Concur. Since June 2007, three of the five U.S. Army Chemical Materials Agency chemical weapons stockpile destruction sites (Anniston, Alabama; Pine Bluff,

Arkansas; and Umatilla, Oregon) have completed contract performance baselines that include contract requirements for operations, secondary waste processing, closure and known risk. Negotiations are under way to complete the contract performance baseline by the end of the third quarter of Fiscal Year 2008 for the Tooele, Utah, site. Negotiations are expected to be completed for the contract requirements and cost estimates associated with the closure phase for the Newport, Indiana, site by the end of the third quarter of Fiscal Year 2008. The Department believes no further direction is required.

RECOMMENDATION 10: The GAO recommends the Secretary of Defense direct the Director of the U.S. Army Chemical Materials Agency to establish a time frame for completing the negotiation for placing all authorized work that has not been priced on contract and ensuring that the negotiations take place.

DoD RESPONSE: Concur. The U.S. Army Chemical Materials Agency has negotiated almost all work presently on contract (current and future) resulting in low levels of authorized, unpriced work. The Department expects negotiations to be completed by the end of the third quarter of Fiscal Year 2008.

RECOMMENDATION 11: The GAO recommends the Secretary of the Defense direct the Director of the U.S. Army Chemical Materials Agency to determine for each of the four incineration site contracts whether greater weight can be applied to performance measures, such as schedule and cost, in award fee plans to further incentivize the systems contractors to increase the destruction rate of chemical agents in a safe and environmentally sound manner.

DoD RESPONSE: Concur. The Department will conduct a review of the award fee plans of the U.S. Army Chemical Materials Agency incineration site contracts to determine whether the weighting factors are appropriate to incentivize the systems contractors to reduce the schedule while operating in a safe, secure, and environmentally-sound manner. The results will be available by second quarter of FY08.

RECOMMENDATION 12: The GAO recommends the Secretary of the Defense direct the Director of the U.S. Army Chemical Materials Agency better align its award fee policy with DoD's March 2006 guidance on award fees.

DoD RESPONSE: Concur. This action was completed on September 7, 2007, in accordance with the March 29, 2006, Memorandum: Subject: Award Fee Contracts, from the Under Secretary of Defense for Acquisition, Technology and Logistics. CMA revised Policy Statement 29, "Procedure for Implementing Contractor Incentives to Include Award Fee (AF) and Performance Based Incentive (PBI) Fee."

RECOMMENDATION 13: The GAO recommends the Secretary of the Defense direct the Director of the U.S. Army Chemical Materials Agency to link more of its award fee criteria to performance measures that focus on identifiable interim outcomes, discrete events, or milestones.

DoD RESPONSE: Partially Concur. The Department will conduct a review of the U.S. Army Chemical Materials Agency (CMA) award fee plans to determine whether there are performance



measures that focus on outcomes or outputs. This review will be completed along with the review of the award fee weighting factors by the end of the second quarter of Fiscal Year 2008. Based on the findings of the review, the Department will determine whether further direction and action is required. Currently, the CMA Fiscal Year 2006 and Fiscal Year 2007 Award Fee plans included objective schedule criteria that focused on U.S. tons of chemical agent destroyed to complete destruction by April 2012.

---

# Appendix IV: GAO Contact and Staff Acknowledgments

---

## GAO Contact

Davi M. D'Agostino, (202) 512-5431 or [dagostinod@gao.gov](mailto:dagostinod@gao.gov)

---

## Acknowledgments

Mark A. Pross, Assistant Director; Bonita P. Anderson; Rodell B. Anderson; Susan C. Ditto; Jennifer K. Echard; Neil D. Feldman; James C. Lawson; Lonnie J. McAllister; Brian L. Ochteau; Charles W. Perdue; Karen A. Richey; John W. Van Schaik; Cheryl A. Weissman; and Alex M. Winograd made key contributions to this report.

---

# Related GAO Products

---

*Cost Assessment Guide: Best Practices for Estimating and Managing Program Costs.* [GAO-07-1134SP](#). Washington, D.C.: July 2007 (Exposure Draft).

*Chemical Demilitarization: Actions Needed to Improve the Reliability of the Army's Cost Comparison Analysis for Treatment and Disposal Options for Newport's VX Hydrolysate.* [GAO-07-240R](#). Washington, D.C.: January 26, 2007.

*Chemical Weapons: Sustained Leadership, Along with Key Strategic Management Tools, Is Needed to Guide DOD's Destruction Program.* [GAO-03-1031](#). Washington, D.C.: September 5, 2003.

*Chemical Weapons: Lessons Learned Program Generally Effective but Could Be Improved and Expanded.* [GAO-02-890](#). Washington, D.C.: September 10, 2002.

*Chemical Weapons: FEMA and Army Must Be Proactive in Preparing States for Emergencies.* [GAO-01-850](#). Washington, D.C.: August 13, 2001.

*Chemical Weapons Disposal: Improvements Needed in Program Accountability and Financial Management.* [GAO/NSIAD-00-80](#). Washington, D.C.: May 8, 2000.

*Chemical Demilitarization: Funding Status of the Chemical Demilitarization Program.* [GAO/NSIAD-99-232R](#). Washington, D.C.: July 29, 1999.

*Chemical Weapons: DOD Does Not Have a Strategy to Address Low-Level Exposures.* [GAO/NSIAD-98-228](#). Washington, D.C.: September 23, 1998.

*Chemical Weapons Stockpile: Changes Needed in the Management of the Emergency Preparedness Program.* [GAO/NSIAD-97-91](#). Washington, D.C.: June 11, 1997.

*Chemical Weapons and Materiel: Key Factors Affecting Disposal Costs and Schedule.* [GAO/T-NSIAD-97-118](#). Washington, D.C.: March 11, 1997.

*Chemical Weapons Stockpile: Emergency Preparedness in Alabama Is Hampered by Management Weaknesses.* [GAO/NSIAD-96-150](#). Washington, D.C.: July 23, 1996.

---

*Chemical Weapons Disposal: Issues Related to DOD's Management.* [GAO/T-NSIAD-95-185](#). Washington, D.C.: July 13, 1995.

*Chemical Weapons: Army's Emergency Preparedness Program Has Financial Management Weaknesses.* [GAO/NSIAD-95-94](#). Washington, D.C.: March 15, 1995.

*Chemical Stockpile Disposal Program Review.* [GAO/NSIAD-95-66R](#). Washington, D.C.: January 12, 1995.

*Chemical Weapons: Stability of the U.S. Stockpile.* [GAO/NSIAD-95-67](#). Washington, D.C.: December 22, 1994.

*Chemical Weapons Disposal: Plans for Nonstockpile Chemical Warfare Materiel Can Be Improved.* [GAO/NSIAD-95-55](#). Washington, D.C.: December 20, 1994.

*Chemical Weapons: Issues Involving Destruction Technologies.* [GAO/T-NSIAD-94-159](#). Washington, D.C.: April 26, 1994.

*Chemical Weapons Destruction: Advantages and Disadvantages of Alternatives to Incineration.* [GAO/NSIAD-94-123](#). Washington, D.C.: March 18, 1994.

*Arms Control: Status of U.S.-Russian Agreements and the Chemical Weapons Convention.* [GAO/NSIAD-94-136](#). Washington, D.C.: March 15, 1994.

*Chemical Weapon Stockpile: Army's Emergency Preparedness Program Has Been Slow to Achieve Results.* [GAO/NSIAD-94-91](#). Washington, D.C.: February 22, 1994.

*Chemical Weapons Storage: Communities Are Not Prepared to Respond to Emergencies.* [GAO/T-NSIAD-93-18](#). Washington, D.C.: July 16, 1993.

*Chemical Weapons Destruction: Issues Affecting Program Cost, Schedule, and Performance.* [GAO/NSIAD-93-50](#). Washington, D.C.: January 21, 1993.

*Chemical Weapons Destruction: Issues Related to Environmental Permitting and Testing Experience.* [GAO/T-NSIAD-92-43](#). Washington, D.C.: June 16, 1992.

---

*Chemical Weapons Disposal.* [GAO/NSIAD-92-219R](#). Washington, D.C.: May 14, 1992.

*Chemical Weapons: Stockpile Destruction Cost Growth and Schedule Slippages Are Likely to Continue.* [GAO/NSIAD-92-18](#). Washington, D.C.: November 20, 1991.

*Chemical Weapons: Physical Security for the U.S. Chemical Stockpile.* [GAO/NSIAD-91-200](#). Washington, D.C.: May 15, 1991.

*Chemical Warfare: DOD's Effort to Remove U.S. Chemical Weapons from Germany.* [GAO/NSIAD-91-105](#). Washington, D.C.: February 13, 1991.

*Chemical Weapons: Status of the Army's M687 Binary Program.* [GAO/NSIAD-90-295](#). Washington, D.C.: September 28, 1990.

*Chemical Weapons: Stockpile Destruction Delayed at the Army's Prototype Disposal Facility.* [GAO/NSIAD-90-222](#). Washington, D.C.: July 30, 1990.

*Chemical Weapons: Obstacles to the Army's Plan to Destroy Obsolete U.S. Stockpile.* [GAO/NSIAD-90-155](#). Washington, D.C.: May 24, 1990.

---

## GAO's Mission

The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

---

## Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site ([www.gao.gov](http://www.gao.gov)). Each weekday, GAO posts newly released reports, testimony, and correspondence on its Web site. To have GAO e-mail you a list of newly posted products every afternoon, go to [www.gao.gov](http://www.gao.gov) and select "E-mail Updates."

---

## Order by Mail or Phone

The first copy of each printed report is free. Additional copies are \$2 each. A check or money order should be made out to the Superintendent of Documents. GAO also accepts VISA and Mastercard. Orders for 100 or more copies mailed to a single address are discounted 25 percent. Orders should be sent to:

U.S. Government Accountability Office  
441 G Street NW, Room LM  
Washington, DC 20548

To order by Phone: Voice: (202) 512-6000  
TDD: (202) 512-2537  
Fax: (202) 512-6061

---

## To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: [www.gao.gov/fraudnet/fraudnet.htm](http://www.gao.gov/fraudnet/fraudnet.htm)

E-mail: [fraudnet@gao.gov](mailto:fraudnet@gao.gov)

Automated answering system: (800) 424-5454 or (202) 512-7470

---

## Congressional Relations

Gloria Jarmon, Managing Director, [JarmonG@gao.gov](mailto:JarmonG@gao.gov), (202) 512-4400  
U.S. Government Accountability Office, 441 G Street NW, Room 7125  
Washington, DC 20548

---

## Public Affairs

Chuck Young, Manager Director, [youngc1@gao.gov](mailto:youngc1@gao.gov), (202) 512-4800  
U.S. Government Accountability Office, 441 G Street NW, Room 7149  
Washington, DC 20548